THE CHARTERED SURVEYOR

The Journal of

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Editorial Notes

New New Town

SKELMERSDALE, between Wigan and Ormskirk, in Lancashire, is to be the site of a New Town, the first to be designated in England and Wales for 11 years. The primary purpose of the New Town will be housing people from Merseyside, and the target population will be 80,000. The Minister of Housing and Local Government, has confirmed an order designating 4,029 acres for the purpose.

The letter to interested parties and local authorities giving Mr. Brooke's decision says that he is satisfied that it is right to seek a site which, while showing the maximum practicable regard to agricultural interests, does not infringe the green belt and is not so far from the parent conurbation as to endanger the transfer of population. In his opinion Skelmersdale meets these criteria. He believes that the New Town should be sufficiently large to make an effective impression within a reasonable time on the great overspill problem of north Merseyside.

Mapping Post-War Development

A NEW map showing the pattern of large-scale development in England and Wales since 1945 is shortly to be published by the Stationery Office. This map is to be described in a paper " The location of post-war development " which is to be given by Dr. E. C. Willatts at the OGM on 4 December.

The map is on the scale of 10 miles to 1 inch and shows the major developments which have taken place since 1945 concerned with land planning, both completed or under construction and firm future projects. The developments include large industrial undertakings, power stations and super-grid lines, new and expanded towns and areas which have had large increases of population and employment.

The resultant picture is in part a legacy of the past. There is still considerable emphasis on some, though not all, of the traditional industrial areas, for instance in south Lancashire, South Wales and the North East. This to some extent stems from their inherent geographical advantages, but it also results from the success of the policy of successive governments in encouraging new industrial developments to go to the Development Areas, which in addition to fixed capital assets in the form of housing and urban facilities in general, have also been able to offer large pools of skilled industrial labour. In general, because the prosperity of the new industries has often been partly offset by a falling labour demand in other local sources of employment, these regions show a lower than average rate of population and employment increase. The map also points to the fact that there have been few major post-war developments in some of the older industrial areas such as the West Yorkshire textile districts, and in parts of Lancashire.

A prominent feature of the map is the even greater emphasis on those areas, such as the Midlands and the South East, where developments have not depended on the local industrial heritage nor on government support. For many types of enterprise they themselves constitute the first choice of economic locations for industrial and commercial development in the mid-twentieth century. This is shown by the disproportionate share of large increases in population and employment which have been enjoyed by the West Midlands area and Greater London and the South East.

The development of vast new power stations supplying electricity for economical transmission by the new super-grid lines, and the vast increase in the use of fuel oil requirements have extended the revolution in the sources of power so that the prime geographical factor of position, especially in relation to ports and markets, has become of overwhelming importance. Now, even less than in the 1930's, need fuel requirements tie industry to the coalfields. Improvements in the national pattern of communications are also tending to reaffirm the predominance of the Birmingham area and metropolitan England.

Railway electrification underlines the importance of access to the central business districts of the largest cities of which London is the supreme example. An all important intensification of office and service employment in these centres, with a redistribution and growth of population on and around the periphery of the urbanized area, has been taking place.

There has been a most pronounced emphasis on estuarine sites as the economic locations for certain types of industry such as oil refining, chemicals, steel and power stations, requiring ample land and supplies of water, and often with problems of effluent disposal and atmospheric pollution. This has involved the development of hitherto underdeveloped estuaries and sheltered coasts such as the Tees and Thames, and also the beginning of development on others, such as the Solent and Milford Haven, which until the last

decade had remained virtually undeveloped. Many of the projects developed or being developed on these areas however, offer a relatively low level of employment in relation to size of project.

In sharp contrast is the general absence, except in a few large cities, of major developments over much of Wales, the South West, the Pennines and Cumbria which include nearly all the virtually uninhabited areas.

Dr. Willatts is a Principal Research Officer at the Ministry, responsible for economic, social and geographical research related to planning. Dr. Willatts will illustrate his paper with slides ; the meeting will begin at 5.45 p.m. and be preceded by tea from 5.30 p.m.

File under WPB ?

THE RICS, the RIBA and the NFBTE have prepared a booklet with the title " Guide to the propagation of trade literature for the building industry." It is being published by the Building Centre and is aimed at encouraging uniformity in trade literature. Emphasising the value of international standard paper sizes (A Size), the SfB system of classification for building materials and the use of simplified layout, the aim is a standard approach to technical data sheets. The booklet is not directed at prestige advertising, but at trade literature issued principally by manufacturers and suppliers for the benefit of architects, surveyors and builders. To achieve a useful purpose such material must tell its story concisely and comprehensively, and then be capable of being stored so that it is readily available when needed. Adequate filing and indexing is essential.

The booklet is designed primarily to help those who issue trade literature, the manufacturers and suppliers of all products involved in building, but it will also be of interest to those who receive those data sheets. It is intended that the booklet will be available in time for the Building Exhibition in November. Distribution will be through the three bodies forming the Joint Committee and the Building Centre. Members interested in obtaining copies are invited to apply to the RICS.

Cut and Shuffle

IT will be strange to have a new Minister of Housing ; Mr. Brooke gave the impression of a permanent fixture at the ministry for he has had a long tenure of office of nearly five years. Five years in which he has piloted through Parliament much contentious legislation including the Rent Act 1957, the 1959 Planning Act and the Rating and Valuation Act 1960. Perhaps Mr. Brooke will be remembered most, however, for his determined policy over green belts.

Mr. Henry Brooke

Dr. Charles Hill

Photographs : The Times

Dr. Charles Hill, the new Minister, first came upon the public ear as the " Radio Doctor." He was first elected to the House of Commons in 1950. He became Parliamentary Secretary, Ministry of Food in 1951 ; Postmaster-General in 1955 ; and a member of the cabinet in 1957 as Chancellor of the Duchy of Lancaster with responsibility for co-ordinating Government information services at home and abroad. Dr. Hill is 57.

Mr. Geoffrey Rippon, who replaces Sir Keith Joseph as Parliamentary Secretary to the Ministry, is 37. He is a barrister, a former leader of the Conservatives in the LCC and was mayor of Surbiton at the age of 26. He was first elected to the House of Commons in 1955 and since then has been Parliamentary Private Secretary to the Minister of Defence and Parliamentary Secretary to the Ministry of Aviation.

Map-Making Today

" MAP-MAKING TODAY " is the title of the Christmas Holiday Lecture for senior pupils to be given at the RICS on 2 and 3 January 1962.

The principal speakers will be Col. W. A. Seymour, BA (PA), Head of the Field Survey Division, Ordnance Survey, Chessington and Lt.-Col. D. L. Griffith, OBE, BA, Commandant of the School of Military Survey, Newbury. With the aid of films and slides, they will explain the essential techniques of map-making, the methods used in the past, methods currently used in ground and aerial surveys, and possible methods in the future.

As an adjunct to the lecture, there will be an extensive exhibition of photographs, instruments, equipment and maps for various purposes (planning, exploration, land use, motoring, cycling and walking).

The lecture and exhibition will be of interest to Fifth and Sixth Formers, particularly those studying Geography or Mathematics. Full details can be obtained from the RICS Press Officer.

30 Guinea Prize

THE closing date for entries for this year's Balch Essex Prize is 15 November. The prize is a cash award of 30 guineas (or 60 guineas if the winning entry is a member of the Rural Essex Branch) for a report on the market for real property during the twelve months ending 30 September 1961 and forecast on probable trends in the year following. Rules and entry forms for the prize can be obtained from the Secretary.

Mr. Alan G. Hancock

MEMBERS will be aware, from last month's journal (page 223), that Mr. Hancock, Assistant Secretary, retired from the staff on 15 August after 42 years' service to the RICS. He will, however, retain a connection with the Institution as he has been appointed Secretary of the Benevolent Fund.

If Mr. Hancock has recovered from a fall in which he broke his kneecap, it is the President's intention, on behalf of all the members of the Institution, to make a presentation to him at the November Council meeting. The President will be expressing the members' gratitude to Mr. Hancock for his loyalty to the Institution and for his untiring work, first as an examinations clerk, then as Registrar and, since 1946, as Assistant Secretary.

Mr. Hancock is known personally to many members who have appreciated his friendly help over their personal concerns and in connection with the Finance and Elections and Examinations Committees. The President will be speaking, not only for the Council, but for all the membership and for the staff, when he wishes him a long and happy retirement.

Personal Announcements

Mr. P. H. BANKS, FRIBA, MISTRUCT.E, (F) has relinquished his appointment as Chief Architect and Surveyor to Messrs. Whitbread & Co. Ltd. and has commenced his own practice as a chartered architect at Bracken House, Keston Park, Kent.

Messrs. CHAS. C. CASTLE AND SON, in association with Messrs. ENGALL, COX AND MILLICHAP, of Cheltenham have opened a branch office at 7, Church Street, Tewkesbury. (Tewkesbury 3246) as from 1 September 1961.

Mr. P. R. DASHWOOD, BSC(EST.MAN.), AAI, (F), Assistant Estate and Rating Surveyor, British Railways, Eastern Region, has been appointed Estate and Rating Surveyor, Eastern Region, as from 1 November 1961.

Mr. H. W. DEAN, FAI, (F) of 9, Guildhall Street, Cambridge, has taken into partnership his son, Mr. JOHN T. DEAN, BA, AAI, (PA). The style of the firm is now Messrs. H. W. DEAN AND SON, chartered surveyors, chartered auctioneers and estate agents and they are practising from 57, Regent Street, Cambridge. (Cambridge 51001–2).

Mr. E. J. FOSTER (F) and Mr. J. H. BROOK (PA) have entered into partnership and have acquired the practice of Messrs. WAGGETT AND BRADFORD. Mr. F. C. W. WAGGETT (F) formerly the sole principal will remain as consultant and the practice will continue as Messrs. WAGGETT AND BRADFORD, chartered quantity surveyors at 25, Victoria Street, London, SW1. and 13, Queensway, Hemel Hempstead, Herts.

Mr. K. R. S. FRENCH, FAI (F) has been taken into partnership with Mr. BRIAN ADAIR, AAI (PA) and Mr. A. G. HADLEY, FAI by KENNETH RYDEN, MC, FAI, as from 2 October 1961. The partnership will practice under the style of Messrs. KENNETH RYDEN AND PARTNERS from 71, Hanover Street, Edinburgh, 2, (Caledonian 1642 and 4319), 54/56, Lower Sloane Street, London, SW1, (Sloane 9245) and 173, St. Vincent Street, Glasgow, C2. (Central 3179).

Messrs. HUMBERT AND FLINT of 6, Lincoln's Inn Fields, EC2, and Badminton, Gloucestershire, have taken into partnership Mr. A. J. LEWIN, FAI (PA) who has been with the firm for a number of years. The style of the firm remains unchanged.

Messrs. JONES, LANG, WOOTTON AND SONS of 16/17, King Street, London, EC2, and 61, St. James's Street, London, SW1. have opened an office in the Caribbean. Mr. F. MELLORS, QALAS (PA) has been appointed resident Manager and the office will be situated in Georgetown, British Guiana. They will also be opening a Scottish office under the management of Mr. ALLAN J. THOMSON (PA) at 68, Gordon Street, Glasgow, C1.

Mr. P. DE LANDE LONG, MA, FLAS (F) has taken up an appointment as Factor for Lady Jean Fforde's Strabane Estate, the Estate Office, Brodick, Isle of Arran. (Brodick 3) as from 19 October 1961.

Mr. J. C. E. LUARD, MA, FLAS (F) has ceased to practice under the style of Messrs. H. P. NYE, LUARD AND CO. but will continue to practice under the style of Messrs. LUARD AND CO., 54, Victoria Street, Westminster, London SW1. (Tate Gallery 4727). The practice of Messrs. H. P. NYE, LUARD AND CO., for many years at 14, Ship Street, Brighton, has now been incorporated in the practice of Messrs. H. D. S. STILES AND CO., at 6, Pavilion Buildings, Brighton, 1, and 3, The Steyne, Worthing.

Mr. H. L. ROY MATTHEWS, CBE, FAI has retired from his position as Consultant to Messrs. MATTHEWS AND GOODMAN as from 31 October 1961 on taking up an appointment as Deputy Chairman of Railway Sites Ltd.

Messrs. NICHOLAS of 4, Albany Courtyard, Piccadilly, London, W1, and Friar Street, Reading, Berks., have taken into partnership Mr. P. J. MITCHELL (F) as from 1 November 1961 on his resignation as Surveyor to the Hartley Wintney Rural District Council.

Major L. W. F. PAGE (PA) has been appointed Lecturer in Land Surveying at the Nigerian College of Technology, Zaria, Enugu, Nigeria.

Mr. MAURICE PLEASANCE (F) of 1, Jesus Lane, Cambridge, has taken into partnership Mr. STANLEY READ (F). The style of the firm will be Messrs. PLEASANCE AND READ, and the address will remain the same.

Mr. KENNETH J. PYNE (PA) has relinquished his appointment as Chief Quantity Surveyor with Messrs. W. S. ATKINS AND PARTNERS and has commenced practice on his own account at 72, Horseferry Road, Westminster, London, SW1. (Victoria 3858.)

Messrs. J. SEYMOUR HARRIS AND PARTNERS have opened a branch quantity surveying office at 188, West Regent Street, Glasgow, C2, under the joint management of Mr. J. D. EMMERSON (PA) and Mr. J. E. A. ALLEN (PA).

Mr. F. SILVESTER WHITE, ARIBA, AMTPI, MIMUN.E (PA) has retired from his appointment as Commissioner for Town Planning to the Government of Tanganyika and taken up an appointment as Burgh Architect and Town Planning Officer with the Corporation of Greenock, Municipal Buildings, Hamilton Street, Greenock.

Mr. L. E. STACE (PA) commenced in private practice as from 1 April 1961 under the style of LEONARD E. STACE, chartered quantity surveyor, 88 High Street, Epping, Essex.

Mr. R. R. PIPER (PA) and Mr. D. H. RICHARDSON (PA) have amalgamated their existing practices and will now practice under the style of Messrs. PIPER AND RICHARDSON, chartered quantity surveyors, at Bank Chambers, 329, High Holborn, London WC1. (Chancery 6300).

Mr. L. A. A. TAYLOR (F), Estate and Rating Surveyor, British Railways, Eastern Region, retired on 31 October 1961.

Messrs. WEATHERALL, GREEN AND SMITH, 22, Chancery Lane, London, WC2, have taken into partnership Mr. DAVID H. R. YORKE (PA).

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Lt. Colonel V. C. DONALDSON, FAI (F) has been elected Chairman of the Board of the Hastings and Thanet Building Society.

Colonel G. R. JUDD, TD, DL (F) has been elected President of the College of Estate Management for 1961–1962.

Mr. P. V. MACKINNON (PA) was awarded the OBE in the Birthday Honours.

Mr. H. OGDEN, MIME, FGS (F) has been elected President of the North Staffordshire Institute of Mining Engineers.

Mr. J. W. SYMONDS (F) was elected President of the Institute of Arbitrators as from June 1961.

Correspondence from Members

QUANTITY SURVEYORS OF THE FUTURE

Sir,

Mr. Arthur J. Willis in his letter published in the October issue, referring to Mr. Sweett's paper on " Building Economics and the Quantity Surveyor," bemoans the profession's failure to attract the university graduate, and gives this as a reason for disagreeing with Mr. Sweett's expressed hope that quantity surveyors may be able to take a university degree before training for the profession. Surely, Sir, such a view is defeatist ? It is true that the quantity surveying profession at present contains few university graduates, but one of the principal reasons for this is the lack of any degree specifically suited to the profession, and the establishment of a degree such as B.Sc.(Building Econ.) would be a large step in the right direction. I would point out to Mr. Willis that in South Africa, where it is possible to obtain a university degree in quantity surveying, there appears to be no shortage of candidates.

Concerning the definition of cost planning, I agree that Mr. Willis's definition (published in the issue for September, 1960 at page 133) is admirable. It is therefore all the more unfortunate that, later on in the same article, he exhibits an apparent complete misunderstanding of the true function of cost planning by equating it with approximate estimating. Mr. Sweett's definition does at least make that distinction with clarity and accuracy.

Finally, Sir, Mr. Willis quotes Aristophanes' lampoon of Socrates, apparently considering that it applies with equal truth to Mr. Sweett. I would only like to point out to Mr. Willis that men read Aristophanes for entertainment, but for wisdom we still turn to Socrates.

Yours faithfully, JOHN H. M. SIMS.

63 Ellerton Road, London, SW18.

Sir,

Mr. Grafton is a principal of a firm in private practice and has reacted to my proposal (see October issue page 184) in exactly the way suggested in the penultimate paragraph of my letter (see September issue page 132). The question is simply this—do the majority of chartered quantity surveyors think as he does on this matter, or as I do ?

Yours faithfully, J. DE METZ.

Tadley, Hants.

Notices and Announcements

TRANSFERS TO FELLOWSHIP

The Council have approved the following transfers to the Fellowship, subject to the fulfilment by the transferred member of his obligations under the Bye-laws : Messrs. A. G. O. Ashpole and P. H. Bell, Mrs. J. Birse, Messrs. Norman Blackburn, H. J. Bodkin, A. P. Borrie, N. A. Coates, D. B. Cook, A. U. Crofts Davies, J. H. Cuthbert, K. L. Davies, K. S. Downs, D. T. Fry, W. A. M. Graham, H. C. Griffiths, Douglas Harvey-Browne, J. F. Hearsum, J. G. Hudson, K. R. Kensall, T. F. Lloyd, E. F. T. McFarlane, F. W. C. Mackmin, B. W. Millhouse, H. M. Mutton, C. L. Neill, D. E. Oakley, K. E. Parker, M. F. Peckham, S. S. Pilch and G. K. Randall, Major H. R. Reed, Messrs. D. J. Rouse, F. W. Ryan, W. T. Seaton, G. J. Shaw, D. A. Shepherd, R. P. Spooner, H. S. Staveley, J. S. R. Storrier, S. F. Wallhead, M. L. Wright, T. B. Yorke and S. J. Young.

BRANCH MEETINGS

London (North-West) Branch

Wednesday, 8 November 1961 at 6 p.m. " The Housing Act 1961 " by Mr. S. W. C. Phillips, CB, Under Secretary to the Ministry of Housing and Local Government.

Warwickshire, Worcestershire and South Staffordshire Branch

Thursday 2 November 1961 at the College of Technology, Gosta Green. " The Bull Ring Centre " a lecture and discussion by the developers and their professional advisers at 5.30 p.m. for 6 p.m.

Thursday, 16 November 1961 at 6.15 p.m. at the Imperial Hotel, Temple Street, Birmingham 2. " Colour Film of the new Coventry Cathedral "—a film made and shown by F. B. Reyner, ARIBA, followed by buffet refreshments.

Yorkshire Branch

Thursday, 23 November 1961 at 2.30 p.m. at the Great Northern Hotel, Leeds. Film entitled " Beating the Romans " and address on " The Doncaster By-pass Motorway."

BRANCH OFFICERS

The following are the Branch Officers who have been elected for the session 1961–62 whose names were not published in the September issue of *The Chartered Surveyor :*

Branch	*Chairman*	*Hon. Sec.*
Eire	A. P. Williams	P. Mulcahy
Northumberland and Durham	J. W. Summers	R. A. S. Sisterson
North Wales	J. G. Lloyd	J. R. Cragg
South Wales and Monmouth	F. J. Matt	P. R. V. Watkins

LIST OF MEMBERS 1962

As intimated in the August and September issues of *The Chartered Surveyor*, the next edition of the List of Members is due to appear in April 1962.

In the interests of economy, the Council decided to make a nominal charge to members for recent Lists and to limit distribution to those members who ordered copies.

The same condition will apply to the distribution of the 1962 List, for which the nominal charge will be 5*s*.

An order form for the List of Members 1962 is enclosed with this issue of *The Chartered Surveyor* for corporate members. Orders should be received at the RICS by not later than 12 December 1961.

It is regretted that further correction to members' entries for the 1962 edition cannot now be accepted.

CHARTERED SURVEYORS' BENEVOLENT FUND

The Annual General Meeting of the donors and subscribers to the Chartered Surveyors' Benevolent Fund will be held at the Institution on Monday, 13 November 1961 at 2.00 p.m. The Agenda is as follows :—

(*a*) to receive the Report of the Committee and the Statement of Accounts for the period ending 30 June 1961, a copy of which will be sent to any subscriber, on request ;

(*b*) the election of Members of the Committee and Officers for the year 1961–1962 ; and

(*c*) the election of two Honorary Auditors, Messrs. C. T. Every and J. G. Elsworthy and of the Auditors, Messrs. Tansley Witt & Co.

The members of the Committee to retire by rotation in accordance with the Articles of Association, and who offer themselves for re-election, are Miss M. Pountney, Messrs. G. Biscoe, J. D. Wix and G. G. Langridge. In order to fill the vacancies created by the death of Mr. M. H. Thackray and the resignation of Mr. A. F. King, the Committee have nominated Mr. W. R. de Silva and Mr. H. H. Temple.

FOURTH CONFERENCE ON AGRICULTURAL ARBITRATIONS

Those who have questions on agricultural arbitrations for answer at the above Conference in January next are requested to send them to the Institution at 12, Great George Street, Parliament Square, SW1, *as soon as possible*, and in any case not later than 18 *November* 1961.

JUNIOR ORGANISATION

Annual Dinner, 1961, Friday, 10 November

There are still a few tickets available for the Junior Organisation Annual Dinner to be held at the Fishmongers' Hall on Friday, 10 November (6.30 for 7.00 p.m.) with the Rt. Rev. Mervyn Stockwood, Bishop of Southwark, as the principal guest. Tickets, price £2 10*s*., may be obtained from the Honorary Secretary of the Junior Organisation. Cheques should be made out to The Royal Institution of Chartered Surveyors, Junior Organisation. Members are asked to give the names of their guests.

JOQS Ordinary General Meeting—Thursday, 23 November 1961

Mr. Ian M. Leslie, OBE, JP, HON.ARIBA, the Editor of *The Builder* will give "A Critical Review of The Building Industry" on Thursday, 23 November 1961 at 6.15 p.m. The meeting, which is organised under the auspices of the Junior Liaison Committee, will be held at the RIBA, and Mr. G. D. Walford (F) Vice-President will be in the Chair. No tickets are required.

JOQS Ordinary General Meeting—Thursday, 7 December 1961

"Interviewmanship"

Do you do yourself justice at interviews? If not come and see the playlets the Junior Organisation is to stage at this meeting on the technique of interviewing and being interviewed for an appointment. The narrator will be the Deputy Chief Valuer, Inland Revenue Valuation Office, Mr. D. P. Iggulden, CBE, DSO, TD, FAI, (F). The meeting is at the Institution at 6.15 p.m. and a buffet tea will be available from 5.30 p.m.

JOQS Christmas Dinner—Wednesday, 13 December 1961

This very popular event will be held again at *The Windsor Castle* which is adjacent to Victoria Station. Tickets are £1 1*s*. each; applications, accompanied by a remittance and giving names of guests, should be sent to Mr. J. H. M. Sims, (PA), c/o L. A. Francis & Sons, Vernon House, Sicilian Avenue, London, WC1.

Notice of a Motion proposing an alteration to the Junior Organisation Constitution and Rules of Procedure, 1956

The Junior Organisation Committee has made the following proposal which will be considered at the Ordinary General Meeting to be held at the Institution on the 7 December 1961:

> "*That Rule* (3)(*a*)(*iv*) *of the Constitution and Rules of Procedure of the Junior Organisation shall be amended by the delection of the words* "*Ex-Officio*" *in line three.*"

INDEX TO VOLUME 93

Copies of the index to Volume 93 of *The Chartered Surveyor* (July 1960–June 1961) are now available free of charge from the Institution.

PRESIDENTIAL ADDRESS 1961

The President (Mr. E. C. Strathon) will deliver his address at the RICS on Monday, 13 November at 5.45 p.m. Tea will be available from 5.15 p.m.

CEM PROVINCIAL LECTURES FOR STUDENTS, 1961

Saturday, 18 November

Exeter. The University.

10.30 a.m. Mr. A. C. Cotton, ARIBA, DIP.ARCH., Lecturer in Building, will lecture on "The examination approach to building construction (including agricultural buildings)."

Saturday, 18 November

Bristol. The University, Queen's Building (entrance University Walk, off Woodland Road), Clifton, Bristol. (Lecture Theatre on First Floor).

10.00 a.m. Mr. F. J. Buckland, FIAAS, MRSH (PA) Senior Lecturer in Building, will lecture on: "The examination approach to Building Construction."

BUILDING SOCIETY VALUATION REPORTS

Valuers' Certificates

As a result of recent discussions between the professional societies and the Building Societies Association in regard to Section 14 of the Building Societies Act, 1960, agreement has been reached on the forms of certificate which building societies have been advised to include in their valuation reports for completion by a valuer who carries out a mortgage valuation.

The two forms of certificate which have been accepted on behalf of the professional societies are set out below. The first form is for use where a principal of a firm himself carries out the inspection. The second is for use where the inspection is carried out by an assistant, and this form requires to be signed both by the assistant and by a principal of the firm.

Form where principal carries out inspection:

I certify that the property described in this report has been inspected by me, that I have valued the property and prepared this report in accordance with the provisions of Section 14 of the Building Societies Act, 1960 (or any provisions re-enacting the same for the time being in force), and that I am not disqualified from reporting on the property by virtue of the said provisions.

Signature of principal of firm instructed to prepare the report .....

Form where the inspection is carried out by an assistant:

We certify that the property described in this report has been inspected by the first signatory below, that we have valued the property and prepared this report in accordance with the provisions of Section 14 of the Building Societies Act, 1960 (or any provisions re-enacting the same for the time being in force), and that we are not disqualified from reporting on the property by virtue of the said provisions.

Signature of authorised assistant of firm instructed to prepare the report, being the person who inspected the property .....

Signature of, or on behalf of, firm instructed to prepare the report .....

J.O. Annual Conference Agenda

The Annual Conference of the Junior Organisation is to be held at the Institution on Friday, 10 *November* 1961 *at* 10.00 *a.m.*

1. Opening address by the President, Mr. E. C. Strathon, FAI (F).
2. Address by the Secretary of the Institution.
3. Brief verbal report from the Honorary Secretary on action taken on resolutions passed at the last Annual Conference.

Resolutions

4. *Surrey*

"This Conference recommends that in view of the changing circumstances of society this Conference requests the Council to review its present interpretation of Bye-law 21(2) so that *salaried employment* in a building or the civil engineering contracting organisation is not inconsistent with corporate membership of the Institution."

5. *Warwicks, Worcs and S. Staffs*

"This Conference recommends that consideration should be given to the amendment of the bye-laws to

permit attached members of the profession to have limited enfranchisement in the running of their own Junior Branch affairs as follows :—

(1) All Junior members and attached members to have the right to vote in Junior Branch affairs, including election of the members for the Committee.

(2) Attached members to have the right to be elected to the Junior Branch Committee which should, however, maintain an appropriate majority of members over attached members.

(3) The Officers of the Junior Branch Committee should always be corporate members."

6. *Northern Ireland*
"This Conference recommends that the JO Annual Conference and Dinner should not be centred in London but in future years should be organised to take place in the main centres throughout the United Kingdom and Eire."

7. *Surrey*
"This Conference recommends under Bye-law 10 the Council should revise the Rules of Professional Examinations that the period of 2 years approved practical training required before, for instance, a graduate in Estate Management becomes eligible for Corporate Membership be amended to a period of 3 years in order to ensure that the graduate's practical training is comparable with his theoretical ability."

8. *London Sub-Committee*
"This Conference recommends that the Council should give definite instructions (and advise on how to follow them) to Branch Committees as to the way in which they should take into account years of service in very senior positions in firms of chartered surveyors when considering applications for transfer to Fellowship."

9. *Lancs, Cheshire and Isle of Man*
"This Conference considers that salaries of chartered surveyors as given in the pamphlet supplied for school and careers masters are pessimistic and unattractive when compared with salaries quoted in recruiting literature of other professions.

It recommends that a more attractive presentation of such literature is attempted, that maximum salaries are quoted for newly qualified members (not just an average) and that indications of possible salary scales on future advancement are quoted."

10. *Kent*
"This Conference proposes that the Institution should prepare and issue to all members upon application a memorandum on all important new legislation of special interest to members."

11. *London Sub-Committee*
"This Conference recommends that all Institution examination papers should be set and marked by chartered surveyors."

12. *Surrey*
"This Conference recommends that the Institution should initiate an investigation into the question of whether compulsory purchase law could be similar to company law to enable a developer who has acquired a substantial majority ownership in a site to acquire the remainder compulsorily."

13. *Lancs, Cheshire and Isle of Man*
"This Conference recommends that a library of tape recordings of talks given at Branch Meetings should be kept at the Institution Library."

14. *Northern Ireland*
"This Conference considers that the Institution should inform examination candidates of their results sufficiently in advance to ensure that all examinees receive their results before these appear in the press."

15. *Middlesex and Urban Essex*
"This Conference deplores the fact that local authorities outside London have no official power to waive bye-laws."

16. *Warwicks, Worcs and S. Staffs*
"This Conference considers it an advantage to a student, probationer or a young chartered quantity surveyor to have a period of practical experience on a building site. In view of this steps should be taken to make this part of the training of the future quantity surveyor."

17. *Lancs, Cheshire and Isle of Man*
"This Conference recommends that a cumulative index of *The Chartered Surveyor* be provided each year for the preceding five years."

18. *London Sub-Committee*
"This Conference recommends that the Council should bring to the attention of the public the advantages of retaining an independent chartered surveyor when considering package deals."

19. *Surrey*
"This Conference disapproves of the present trend on the part of educational institutions to create their own internal examinations or diplomas as alternatives to the examinations of the Institution and considers that the Council should discourage this trend as it may lead to a lowering of training standards and consequential damage to the standing of the Institution."

20. *London Sub-Committee*
"This Conference recommends that the Institution should form a committee to examine present town planning legislation and administration with a view to deciding whether the Institution should recommend the government to initiate amending and consolidating legislation."

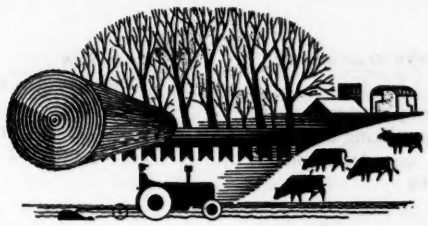
21. *London Sub-Committee*
"This Conference considers that simple explanatory booklets and notes on Acts of Parliament affecting property are extremely useful to members and suggests that the Institution approaches Her Majesty's Stationery Office in order to urge them to produce a wider range than at present."

22. *Beds and Herts*
"This Conference considers that the Institution should investigate the provision of a service to Branch Secretaries whereby drafts of Branch circulars could be sent to the Institution for duplication and despatched to the Branch members, the envelopes being addressed on the Institution's addressing machines and an up to date list of members being kept at the Institution."

23. *Beds and Herts*
"This Conference considers that in view of the previous resolution the Institution should, when replacing or adding to its present duplicating equipment, investigate the possibility of obtaining machines which give a superior impression similar to that produced by printing."

ITEM FOR DISCUSSION

24. Liaison with Junior Members Overseas.



AGRICULTURE AND FORESTRY

Valuation of Long-Term Improvements: the Two-way Approach

By ARTHUR NOBLE, BSC, FLAS, (F)

In an article which was published in the September issue, Mr. Noble, who is Head of the Estate Management Department at the Royal Agricultural College, Cirencester, suggested a new approach to tenant right valuations; in this article Mr. Noble applies his new approach to the valuation of long-term improvements

IN 1848 a select Committee, appointed to take evidence on tenant-right customs, reported amongst other things that the valuation of tenant-right matters was made by valuers on the basis of the cost of the work spread over an appropriate number of years.

In *English Agriculture in* 1850–51, J. Caird wrote of the practice of tenant-right valuation, "Obsolete farming operations were being valued at original cost, irrespective of their value to the incomer, who had no say in the operations he paid for."

Constant pressure by the farming interest during the following 20 years or so achieved the passing of the Agricultural Holdings Act, 1875, under which three categories of improvement were set out :—

(*a*) Short-term improvements which were to be taken at "value to an incoming tenant."

(*b*) Medium-term improvements, which required prior notice to be given to the landlord, were to be valued on original cost spread over seven years.

(*c*) Long-term improvements, which required the prior consent of the landlord, were also to be valued on original cost, but spread over 20 years.

As the 1875 Act was permissive only in nature, it was largely ineffective, and it was followed by another Agricultural Holdings Act in 1883, the main point of which was to cancel the "contracting-out" provision of the 1875 Act. At the same time the 1883 Act accepted the principle of "value to an incoming tenant" as the basis of assessment for all three classes of improvement, whether long, medium or short-term.

The principle of "value to an incoming tenant" was continued for all improvements by the Agricultural Holdings Acts of 1908 and 1923 up to the passing of the 1947–48 legislation.

The Agricultural Holdings Act, 1948, brought a new classification of tenant-right matters into long-term improvements, short-term improvements, and other tenant-right matters. Long-term improvements were themselves subdivided into two classes according to whether landlord's consent was a *sine qua non* or could be substituted by the consent of the Minister of Agriculture (since 1958 the Agricultural Land Tribunal).

Whilst the short-term improvements and tenant-right matters in the 4th schedule were to continue to be taken at "value to an incoming tenant," the long-term improvements of both classes in the 3rd schedule were to be assessed at "an amount equal to the increase attributable to the improvement in the value of the agricultural holding as a holding, having regard to the character and situation of the holding and the average requirements of tenants reasonably skilled in husbandry." Methods of valuation were not prescribed in regulations for long-term improvements as for short-term improvements and tenant-right matters.

Two authorities may be quoted as indicating that "increase in value of the holding" is in itself a method of valuation rather than a principle of compensation, namely Mustoe & Wood in "Agricultural Law and Tenant Right" and Muir-Watt and Chapman in "Agricultural Holdings and Tenant Right Valuation." Both hint that little difference would be apparent in practice between "increase in value of the holding" and "value to an incoming tenant."

Indeed, little difference has been apparent since 1948, since the valuation of long-term improvements has continued in practice on the basis of "cost of the works," both valuers viewing the matter from the outgoer's angle. Too little account has been taken of the ingoer's angle. It makes little difference to the argument whether the landlord or the incoming tenant be regarded as the ingoer. If the landlord takes over the improvement, he charges it to the incoming tenant as extra rent, which has got ultimately to be *produced* from the land.

The Cost Approach

In its simplest form the normal valuation of the long-term improvement follows the principle set out in the 1875 Act, namely, original cost spread over 20 years. Some latitude is exercised perhaps in regard to the period over which the cost is written off, a range of 15 to 40 years possibly being used, but only too often the 20-year period is rigidly adhered to.

Two examples might be taken to illustrate the sytem of so closely sticking to the outgoer's viewpoint; both of these

will later be developed through to their " value to an incomer."

1. *Water Supply Scheme*

Rough costs for the installation of a complete new scheme to a 200-acre farm, carrying a herd of 30 milking cows, not only to the buildings but to all the land, in order to pursue a system of alternate husbandry, might be :—

	£
Well boring	200
Pump engine and pump-house ...	200
Reservoir tank	150
Piping 300 yards 1½ inch	150
100 yards ½ inch	25
Six troughs	75
	800
Grant, 40 per cent...	320
Net Cost	£480

If it is decided that it is fair to write this sum off over 30 years (an expression much to be preferred to saying that the improvement has a 30-year life), and it is assumed that the outgoer leaves the farm after 20 years, he will put in a claim for (avoiding the expression " be entitled to ") £16 × 10 = £160.

2. *Dutch Barn*

The cost of erecting a four-bay Dutch barn on a similar holding might be taken as £120 per bay, *i.e.*, £480, the effective capacity of each bay being 30 feet × 15 feet × 15 feet. The net cost after 33⅓ per cent grant would amount to £320.

If it is decided to write this cost off over 16 years, there would arise an annual sum of £20, and an outgoer leaving at the end of 12 years would claim £20 × 4 = £80.

Original v. Up-to-Date Cost

Some valuers would nowadays argue that these simple calculations should be based on the present-day cost of erection or installation rather than the actual original figure. The logic of this argument is a little difficult to see, if the cost system is to be used at all, though it would seem to be a vague attempt to assess the up-to-date worth to the ingoer.

The Half-Way Approach

In order to conform more nearly to the principle demanded by the 1948 Act, " the increased value of the holding as a holding," and perhaps a little to satisfy one's valuation ego, a percentage may be taken on the cost of the work to represent rental value of the improvement and then capitalised on the dual rate tables for the period of enjoyment remaining to the ingoer.

To say that the increased value of the holding is the difference between the " before " and " after " values of the holding is begging the question and gets the problem no further.

Application of the half-way approach to the two examples would give figures perhaps as follows :—

1. *Water-Supply Scheme*

Net Cost of Scheme (as above)	=	£480
Rental Value, say 8 per cent	=	£38 per annum
Y.P. for 10 years at 8 per cent and 2½ per cent	=	5.9
		£224

2. *Dutch Barn*

Net Cost (as above)	=	£320
Rental Value, say 10 per cent	=	£32 per annum
Y.P. for 4 years at 10 per cent and 2½ per cent	=	2.9
		£93

No argument will be put up for the particular percentage rates used except to say that they are consistent with the views expressed since 1948 by the landowners representative body and others.

It will be noted that the figures given are not wildly at variance with the pure cost figures. In both cases they are higher and would seem to show that a landlord taking over the improvement would be justified in paying more than the written-down cost.

On the other hand the calculation begins basically with cost, whilst the percentage rates are open to considerable question and take no account of the tenant's ability to find the rent out of the improvement.

The Profitability Approach

When one proceeds to examine whether it is possible to assess the actual value of the improvement to the management of the farm, bearing in mind the schedule of long-term improvements, they would seem to fall into three categories of benefit :—

(*a*) Straightforward increase in productivity, *e.g.*, the water supply scheme.

(*b*) Saving of labour, waste, or wear and tear, *e.g.*, the Dutch barn.

(*c*) Higher price of saleable product, *e.g.*, grain storage allows the farmer to wait for the better market.

Water Supply Scheme

The farming tenant, in laying water onto all his fields, must have had in mind some increase in production through his proposed system of alternate husbandry, to which it should be possible to put some measure.

Reasonable assumptions are that he might be anticipating one of two things or possibly a bit of both :—

(*a*) To increase the milk yield from each of his 30 cows from 750 gallons up to 1,000 gallons = 7,500 gallons per annum.

(*b*) To increase his milking herd from 30 to 40 cows at 750 gallons = 7,500 gallons per annum.

An assessment might then be made as follows:

Gross milk sales (attributable to improvement) 7,500 gallons at 3*s.* 0*d.*	=	£1,125
Rental value of the water scheme 10 per cent of gross sales	=	112
Cost of upkeep per annum, say		30
Net Rental Value		£82
Y.P. for 10 years at 8 per cent and 2½ per cent (as under half-way approach)		5.9
		£484

It is appreciated that the 10 per cent of gross sales and the cost of upkeep are both open to query and argument, but no more so than the percentage rates or the amortization periods

used in the other calculations. A decrease in the 10 per cent and an increase in the £30 would still leave a considerable excess in the final result over the figure of £160 obtained in the cost approach and the £224 obtained in the half-way approach.

Dutch Barn

The building of a Dutch barn at a net cost of £320 cannot be converted to terms of a direct increase in productivity, but it can be set out in terms of a saving in labour (and material) and hence of ultimate profitability.

The storage capacity of four bays, each 15 feet × 30 feet × 15 feet, amounts to 1,000 cubic yards, and at 2 cwts per cubic yard the new barn would hold 100 tons of hay.

Now, if the object of the building was primarily to save the thatching of hay-stacks, the following calculation may be made :—

The hay might have been built into four stacks of 25 tons each. An average effective height of a haystack is 10 feet, including allowance for roof. The volume of each stack would need to be 250 cubic yards = 6,750 cubic feet, equivalent to a floor area of 675 square feet, or say 20 feet = 33 feet 9 inches.

Slope height of a roof on a 20-foot span and at an angle of 45° is 14 feet. The area to be thatched would therefore amount to 2 × 14 feet × 33 feet 9 inches = 945 square feet or say 9½ squares per stack, a total of 38 squares over the four stacks.

If the cost of thatching (labour and material) be put at 30*s.* per square, it follows that the Dutch barn represents a gross saving to the farmer of £57 per annum, and cost saved is the same thing as profit gained. On the other hand cost of upkeep of the barn would have to be taken into account.

The final valuation in this case might therefore be set out as follows :—

Annual Value of the Improvement	=	£57 per annum
Cost of upkeep, say		10 „
Net Annual Value	=	£47 „
Y.P. for 4 years at 10 per cent and 2½ per cent (as under Half-Way Approach)	=	2.9
		£136

The comparative figures under the other methods are £80 and £93 respectively. No account has been taken of other benefits from the barn such as lower proportion of waste in the hay, and saving of labour in stripping thatch.

Grants

Section 53 of the 1948 Act directs that grants made for the various works are to be taken into account in calculating the compensation, and this can be done quite simply where the valuation is approached from the cost angle. It is not easy when the valuation is approached from the productivity angle, nor is there any case for doing so. Further it is a little difficult to see the case for deducting the grant under any method of assessment, whether the *principle* involved is construed as the broad one of " value to an incomer "or the narrower one of " increase in value of the holding." The various grants are supposed to be given as an incentive to the sitting farmer to increase production or save costs. Some measure of the incentive is lost if he is to be deprived of the unexhausted value of the grant on quitting. The ingoer should have no cause for complaint if he is satisfied that he is paying no more than the value of the improvement to him.

Other Works

The criticism may be lodged that two improvements have been chosen for illustration, to which the profitability approach is reasonably simply applied. What of the long list of other improvements in the 3rd schedule? A surprising number of the others on examination can be reduced to the same terms. A hint on the method of calculating yet others, such as the grain store, has already been given.

It would be when faced with such a one as the laying of a new farm road that the valuer's ingenuity would be tested to the utmost. But there must be some way of estimating the saving of (*a*) wear and tear on tractors, implements and machinery, (*b*) time in getting to and from farm fields. Possibly a combination of the modern Box and Cox of agriculture, the farm management expert and the work-study expert, would be required.

Conclusion

The dual approach to the valuation is as well worth examination in the case of long-term improvements as in the case of short-term improvements and other tenant-right matters.

Notices

GUARDING STATIONARY FARM MACHINERY

On 14 July 1961, the Agriculture (Stationary Machinery) Regulations became fully operative. These regulations apply to all agricultural machinery designed or adapted for stationary use only on farms where workers are employed. The regulations do not apply to threshers, hullers, balers or trussers which are subject to special regulations which came into force on 1st August.

Components of stationary machines must be situated or guarded in such a way as to protect a worker from contact with them. Clearly marked stopping devices and means of disconnecting power must be supplied. Other requirements relate to maintenance of belts and natural or artificial lighting. Workers must make use of guards and report damaged ones.

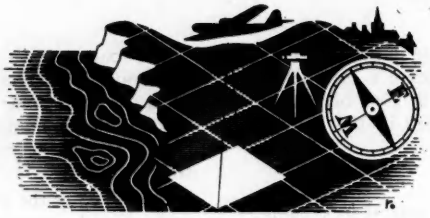
Full details are given in a free explanatory leaflet obtainable from Ministry of Agriculture.

FARM BUILDINGS DEMONSTRATION

The Ministry of Agriculture have arranged a demonstration of farm buildings at Springhead Farm, Storrington, Sussex (by kind permission of the owner, the Hon. Clive Pearson) on 10 November at 11.00 a.m. Details can be obtained from the Divisional Land Commissioner, MAFF, 138 London Road, Guildford, Surrey.

LAND DRAINAGE

The Upper Medway Internal Drainage Board have sealed a code of land drainage bye-laws under section 47 of the Land Drainage Act, 1930. Copies of the Bye-laws may be obtained from the Clerk of the Board, 17a Bank Street, Maidstone. The Drainage District is situated in the County of Kent.



LAND SURVEYING AND MINING SURVEYING

The use of Radar Altimetry in the Mapping of a Reservoir

By P. G. MOTT, BA, AMICE, (F)

This paper discusses the use of radar altimetry in the mapping of a reservoir and the route of a projected transmission line ; it was presented in conjunction with a paper by Mr. J. A. Eden, published in the October 1961 *issue of* The Chartered Surveyor, *at a land surveyors general meeting on* 12 *October* 1961. *Mr. Mott is Technical Director for Hunting Surveys Ltd.*

IN April 1958, the Electricity Corporation of Nigeria, together with the Federal and Northern Region Governments of Nigeria, appointed Balfour Beatty & Co., Ltd., and NEDECO (the Dutch Consulting Engineers) jointly to investigate the feasibility of controlling the Niger at or upstream of Jebba for the purpose of power production, irrigation, navigation and flood control.

In the latter part of 1958 some preliminary mapping was carried out from existing RAF and Nigerian Government photography of a possible dam site at Jebba and a reservoir above it. The results of this mapping were embodied in a Feasibility Report which showed that a reservoir of sufficient capacity to control the river would be most economically provided by a dam located about 60 miles upstream of Jebba. The Feasibility Report was accepted by the clients and a further and more detailed investigation was put in hand.

Consequently, in July 1959, Hunting Surveys Limited, who had carried out the preliminary survey, were commissioned to prepare large-scale photogrammetric plans of dam sites at Kurwasa and Donko and to produce a 1/50,000 scale map with contours at 20 feet vertical intervals covering a reservoir area of approximately 1,500 square miles upstream of Kurwasa.

To enable the new development to be commissioned in time to meet the rising demand for electricity supply before further large-scale thermal stations became necessary, the report on the detailed investigation was required during 1960. This meant that the completed reservoir plans had to be in the hands of the engineers not later than February, 1960.

The Problem

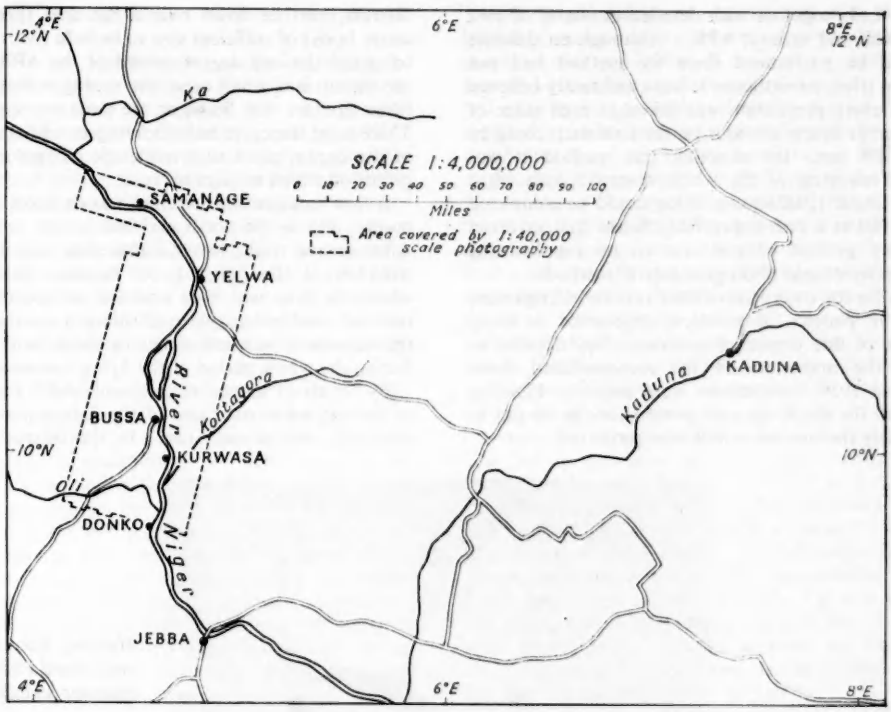
By ground levelling the minimum height control required for photogrammetric mapping of the reservoir area was estimated to take a party of 10 men four months to complete. The rains were unlikely to cease before early September, or possibly later, which meant that vertical photography could not be undertaken until mid-September at the earliest and the levelling programme might, therefore, extend until the end of February which was the latest date for delivery of the maps.

The Suggested Solution

There appeared to be only one possible way of carrying out the work in time—by the use of the Airborne Profile Recorder. APR control, so far as was known, had never previously been employed for controlling block mapping with a contour interval of 20 feet accurate to $\pm$ 10 feet at worst and with the desirability of $\pm$ 5 feet accuracy if this could be achieved.

Having decided in principle on the use of APR, consideration was given to the possibility of averaging out the residual errors of the APR lines by aerotriangulation of each photo strip. This however would have entailed an additional six weeks of machine work (as well as adding to the cost) and was ruled out by the timing of the programme. Instead it was planned to eliminate aerotriangulation entirely and to rely on setting each overlap individually on control taken from three independent APR profiles; the central APR line would be flown from a height of 20,000 a.m.s.l. simultaneously with the vertical photography and would therefore require no additional flying. Further flights, with APR and 35 mm. recording camera only, would be made along the lateral overlaps of the photo cover at heights between 5,000 and 10,000 feet (the actual heights of these control runs being adjusted to meet prevailing cloud and barometric conditions and to be left to the discretion of the aircrew).

Each APR profile would be "held" at its ends by tie strips controlled by ground levelling and would be further checked against an additional tie strip provided approximately half-way between the north and south limits of the reservoir. Because the country was in many places covered by thick bush it was considered that it would take too long to position the terminal tie strips in the ideal position cutting at right-angles across the ends of the main flight lines. For this reason the tie strips were planned wherever possible to



follow existing roads and to make use of the block control to be established at the Kurwasa dam site and at Yelwa Township. The plan was to fly these " road ties " in the period July/August below cloud-base during the wet season. By confining the strips along or near the main roads, it was hoped that the control parties could commence putting in the level control immediately this early photography was available, thus completing the essential data for controlling the APR runs in advance of the main coverage and APR flying, which would not be possible until September/October. Levelling along clear roads would also be faster than cross country, while the road itself would help considerably in the identification of photo-points.

Subsequent experience proved that the country was not so difficult of access as had been feared at first and that it would have saved some photogrammetric work, with perhaps increased accuracy, if the ideal theoretical locations of the tie strips had been adhered to, and if the level lines had been driven straight across country. Against this may be set the fact that by using the roads a large number of additional spot levels and bench-marks were included which have since proved of value in later stages of the work by providing a close check on the accuracy of the APR control.

After adjustment of the APR profiles the intention was to select only those points along each profile which coincided with the principal points of the 35 mm. recording camera wherever these fell on even terrain and in areas of minimum record " noise." In this way it was hoped to obtain at least nine selected control points for the levelling of each overlap and to adopt a best mean fit in setting the overlap on these nine points. A further check on the accuracy would automatically result from comparison of the values obtained from adjoining overlaps.

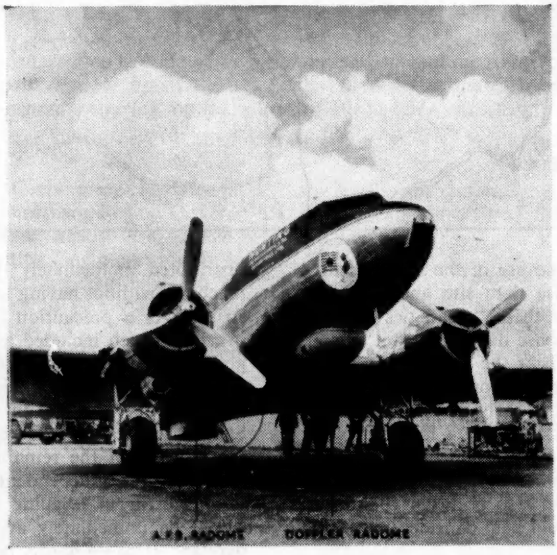
This procedure had the advantage that once the APR strips had been reduced the detail mapping and contouring could be distributed immediately between a number of plotting machines without having to wait for block adjustment of the strips. As a precaution it was planned to start with the overlaps which included any level points established on the ground, where an absolute check was possible between the value of the photogrammetric height based on the setting from APR control and that of the ground spot height value. Subject to these checks being within the required tolerance the plotting of the remaining overlaps could then proceed more or less independently on the assumption that any serious error in levelling an overlap, were such to occur, would be immediately apparent when passing to the next overlap. It could hardly be coincidence if the error distribution between points obtained from three profiles run at different times (and often on different days) should lie within the limits of tolerance of the contouring, and if moreover every overlap, when set up independently, should give a satisfactory edge comparison with its neighbours.

It was felt however that insufficient was known of the behaviour of the APR under African conditions, and particularly when using it within such close limits of tolerance. For this reason a " belt and braces " policy was considered advisable whereby allowance in the flying programme was made for additional photo APR strips at intervals of approximately 25 miles cutting across the main flight lines and including some co-ordinated and heighted control points positioned by previous triangulation and tellurometer observations, and which would be pre-marked on the ground prior to photography. Only in the event of the APR information proving unequal to the accuracy required for setting the overlaps individually, would resort be made to this supplementary coverage : in practice this never proved to be necessary except as a cross check on the work.

Early in August 1959, a proposal on the above lines was presented to the Consulting Engineers, Messrs. Balfour

Beatty & Co., Ltd., together with detailed estimates of cost and delivery, with and without APR. Although no absolute accuracy could be guaranteed since the method had not previously been tried, nevertheless it was confidently believed that, provided every precaution was taken at each stage of the work, the error in any contour on the final map could be limited to $\pm$ 10 feet. By adopting this method it was estimated that mapping of the whole reservoir area (then believed to be about 1,500 square miles) could be completed by February 1960 at a cost appreciably below that involved if the necessary ground control was to be supplied for mapping by conventional photogrammetric methods.

It says much for the enterprise of the Consulting Engineers, that despite the paucity of practical experience in using APR for work of this degree of accuracy, they decided to proceed with the operation on the recommended lines. Early in August 1959, instructions were given to Hunting Surveys Limited for the flying and groundwork to be put in hand immediately the weather conditions permitted.



Hunting Surveys Dakota Aircraft fitted with airborne profile recorder and Doppler navigator

Flying Operations

The aircraft used for the main coverage was a D.C.3 fitted with two-stage Pratt & Whitney engines and specially modified to carry both the Mark V APR (manufactured by Canadian Applied Research Limited) and Marconi AD2000 Doppler equipment in addition to a wide-angle survey camera. In this case the Doppler navigator was not used for reasons to be given later. The flight crew consisted of two pilots, a navigator, a camera operator and an electronics engineer.

The aircraft positioned at Kaduna on 5 October 1959. The 6 October was used to complete the unloading operations, the setting up and testing of the APR equipment, the survey camera, and the 35 mm. recording camera. By that evening all the equipment was fully operational and on 7 October a test flight was carried out of four hours' duration which proved invaluable both from the technical and navigation angle. The first productive sortie was flown the following day.

Before and after any APR flying it is standard practice to carry out at operational height a "zero" setting of the hypsometer over a known *datum point*. For this purpose the aircraft must be flown over a flat area (preferably a large water body) of sufficient size to include (with plenty of room to spare) the one degree spread of the APR beam. When the datum is a small area, the setting will normally require three separate runs flown on the same or reciprocal headings. There must therefore be sufficient ground detail in the vicinity of the datum point to provide the navigator with reference points on which to align his runs.

A first requirement therefore was to select two such datum points, one in the north and one in the south of the area. After several trials, two suitable sites were located on wide stretches of the Niger River between well-defined banks where the flow was even and the surface uninterrupted by rock or sandbanks. At each place a continuous record of the water-level was maintained by the ground levelling parties during the whole period of the flying operations.

By means of looped circuits each APR line was extended to include a run over one of the datum points, both at the start and end of each run. In the interval between completing the main run and the circuit required to bring the aircraft on track with the datum run, the APR record could clearly be no longer relied upon and was therefore switched off. This break in the record, though undesirable, is inevitable in areas where no coast-line or suitable flat body exists over which the runs can be extended without introducing a turn. It was found that the height indicated by the APR over datum points drifted at rates between 17 and 28 feet per hour. These figures agreed closely with the diurnal barometric changes reported by metereological stations at Kano and Kaduna airfield. The same drift rates were found to apply whether the aircraft was flying at 6,000 feet or 20,000 feet. For future work it would appear that a recording barograph situated in or close to the survey area would be an advantage, not for the purpose of correcting the APR results but rather to keep a check on sudden variations in pressure conditions that would necessitate re-flying any APR line.

Reduction of the APR profiles by means of these datum points was in fact never necessary since other more reliable data was available. It is however of interest to note that the subsequent analysis of line 6/7 using the datum points showed errors of + 11 feet and + 12 feet at the terminal

points of the main run (*i.e.*, where it crossed the ground control points).

Adequate co-ordinate control for establishing the scale of the mapping was already available in the area, and no attempt was made therefore to calibrate the APR for the absolute height of the record, since this is only required if it is to be used for horizontal scaling of the overlap. In this connection it is worth noting that absolute calibration should be carried out twice a day, at the start and finish of a sortie. Consequently if the base airfield is unsuitable, and if there is no alternative within reasonable distance of the mapping area, a great deal of wasteful flying might be involved which could result in this application of APR being of doubtful value, and in certain conditions altogether impracticable. As already explained, absolute calibration was unnecessary on the Niger Survey.

Doppler when combined with APR is only likely to be of value where measurement of the drift angle is critical in determining the slope of the isobaric surface by Henry's formula. A factor in determining the correction to be applied by Henry's formula is the sine of the latitude which in low altitudes approaches zero. In this case the latitude of the area was only 10° N. (*i.e.*, sine $10° < 0.2$), and it was not considered that the additional accuracy to be gained in the reading of the drift angles by the introduction of Doppler would make any material difference to the slope correction : Doppler was therefore omitted from the record. In practice the barometric conditions in the area proved to be so consistent that the variation in drift angle on any one run was insignificant and the maximum irregularity in slope of the isobaric surface experienced on any line was shown to be negligible.

Navigation throughout was by visual methods, employing (for combined survey-photography/APR lines) the standard techniques of establishing master runs and then building up on these by reference to the lateral overlap of strips already flown and processed in the field. These high-level photo/APR runs which included one tie strip (No. 1) were made at an altitude of approximately 20,500 feet above mean sea level, the camera used being the Wild RC8 fitted with Aviogon 6-inch lens on 9 inch × 9 inch format. Since the mean ground level was in the region of 500 feet the average scale of photography was 1/40,000.

All other flying was carried out at altitudes of 10,000 feet and below. Three tie strips of combined photo/APR were flown at approximately 9,000 feet across the main N–S photographic lines and included several trig-points which had been premarked for identification. These strips as well as the high-level runs 12, 13, 14 subsequently proved to be unnecessary and were never used. The remaining flying involved the APR record only, together with its associated 35 mm. locating camera : these runs were flown at heights varying between 6,400 feet and 10,000 feet a.m.s.l. along the lateral overlaps of the survey cover.

The pattern of the flying carried out is shown in Diagram A, the APR lines actually used for the subsequent photogrammetric work being shown in Diagram B. More detailed information on flying heights, drift, wind force, etc., is given in Appendix I at the end of the paper.

The precision of the navigation could scarcely have been improved on, and no difficulty seems to have been experienced by the navigator in flying the low-level APR lines where they were required in the centre of the lateral overlap. The very small camera tilts (maximum forward 1½° and lateral 1½°) undoubtedly contributed to the accuracy and consistency of the APR readings.

Very few troubles were experienced with the equipment. Initially the automatic gain control of the receiver failed to operate under conditions of maximum reflection : this was traced to a hair-line crack in a printed circuit. A magnetron had also to be replaced. Near the end of the survey the hypsometer record showed a periodic variation varying from ± 1.5 feet to ± 5 feet in amplitude ; both period and amplitude varied with the temperature of the outside of the hypsometer. The exact cause of the defect was never established but it proved possible to minimise its effect by drawing a mean line through the small periodic variations where these were present in the record. For all practical purposes the error introduced on this account was negligible in the final analysis. Otherwise the equipment gave no trouble whatever and the " cleanness " of the final record is evidence of the stable conditions, and the small amount of extraneous noise.

The best operating period for the APR runs was found to be before mid-day; the afternoons almost invariably brought the formation of cumulus and a marked increase in turbulence. The full programme of APR and survey photography (including the extra flying carried out as a precaution) was completed in nineteen days, of which five days, or 26 per cent was required for the APR lines flown along the lateral overlap of the vertical photo cover. The total area included by the photography amounted to 4,000 square miles and contained 2,200 line miles of APR record. Of this approximately 900 miles were flown independently of the survey cover and were subsequently used for control, the remaining 1,300 line miles being rejected either as being redundant or flown too high for the accuracy of the work.

Of the total cost of the operation one-third was on APR flying and two-thirds on photographic flying. However, with the experience now available it should be possible in future to limit the proportion of APR flying even further.

APR Reduction and Photogrammetry

Reduction of the APR strips was carried out in the standard manner. The 35 mm. exposures were used to transfer the principal points of the locating camera to the 1/40,000 scale photography. By reference to the positions of the 35 mm. p.ps. on the profile and by stereo-examination of the main cover, it was possible to eliminate those p.ps. which fell in areas of steep slopes or where the record indicated excessive noise. Possibly due in some degree to the effect of vegetation cover, the APR record showed over the greater part of its length a noise band of about 5 feet and the control value read off the record at any point was taken to be the mean between the upper and lower limits of the band. As a general rule, after disregarding the unsuitable 35 mm. p.ps., there remained three or four heights along each APR line within the area of an overlap—*i.e.*, a minimum of nine APR spot heights for the setting of an overlap. As explained later these points falling only in the lateral profiles were eventually used in the photogrammetric work.

Plan control was provided by a slotted template lay-down based on a close framework of co-ordinated points, shown by black triangles on Diagram A. The majority of these points formed part of an existing primary series carried out by the Federal Survey Department. The remaining points were supplied by Tellurometer during the same period as the height control for the reservoir survey. All 22 points used for plan control were premarked before photography and were therefore precisely identified on the survey cover.

The Zeiss Secator was used for cutting the templates which were of cobex sheeting. No trouble whatever was experienced during the assembly to which the excellent flight pattern, the

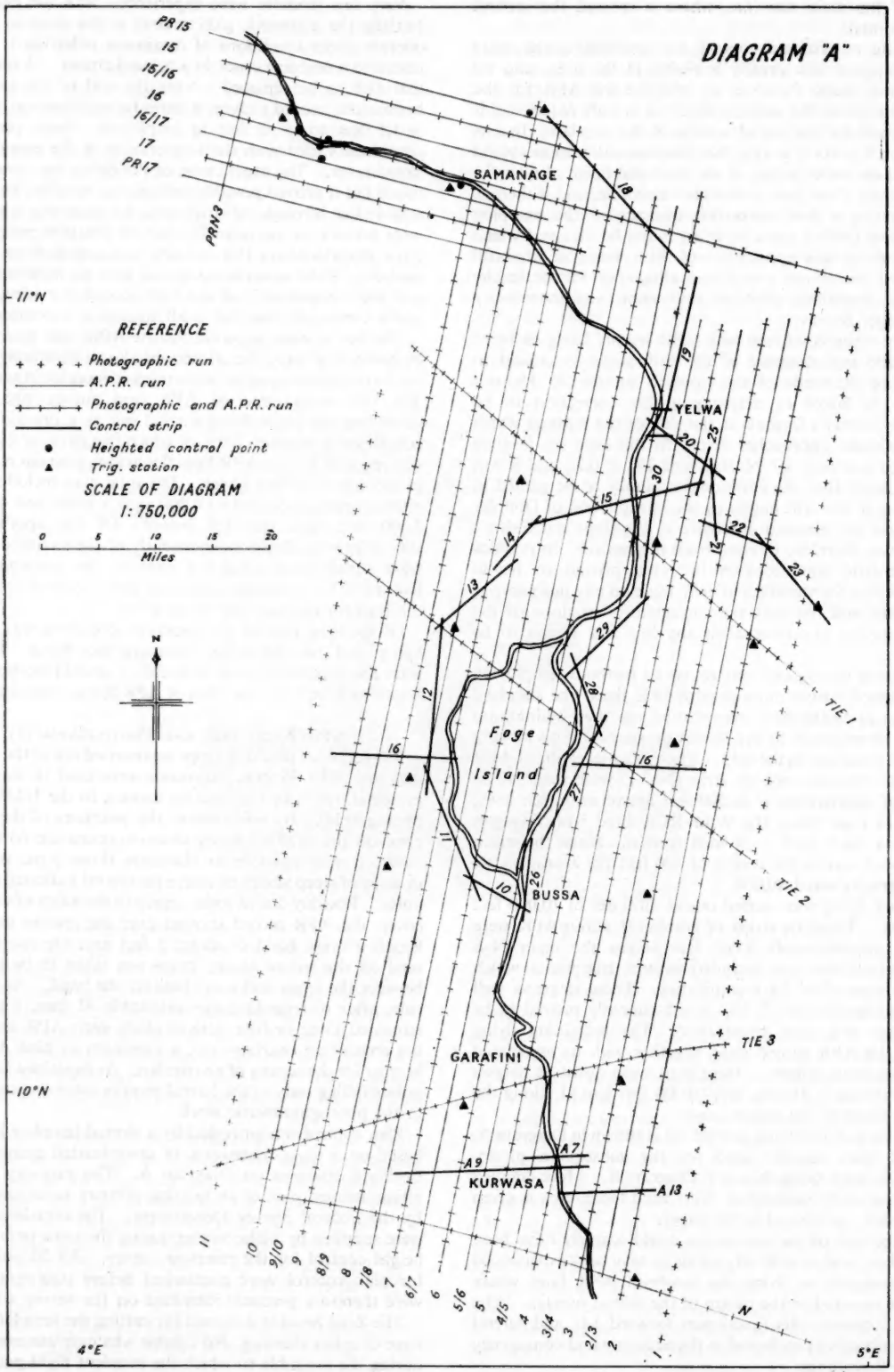


DIAGRAM "A"
PR15
15
15/16
16
16/17
17
PR17
PRN3
SAMANAGE
YELWA
BUSSA
GARAFINI
KURWASA
Fage
Island
TIE 1
TIE 2
TIE 3
A9
A7
A13
11°N
10°N
4°E
5°E
N
REFERENCE
Photographic run
A.P.R. run
Photographic and A.P.R. run
Control strip
Heighted control point
Trig. station
SCALE OF DIAGRAM
1: 750,000
0 5 10 15 20
Miles

accuracy and precise identification of the control points, and the relatively flat nature of the country (the total height relief in the area did not exceed 150 feet) all no doubt contributed.

As already explained, a number of control strips were flown at low level in July and August during the rainy season following the line of existing roads. During August and September ground control was provided for these strips to a pattern of four levelled points every seventh overlap and two points midway between. A large part of this control was in practice a by-product of essential levelling which was required to connect the bench-mark at Bussa to a datum near Samanage at the extreme northern limit of the reservoir.

The low-level control strips (flown between 3,000 feet and 5,000 feet a.m.s.l. Nos. 10–31 in the Diagram) were then set up in the Multiplex which was used to give out photogrammetric spot heights on the identified positions of the selected 35mm. principal points at intervals along each APR strip where it crossed a control run. The zones of control so provided are indicated by open circles on Diagram B and include additional heights given out by Wild A8 using the existing large-scale cover of the Kurwasa Dam site (runs prefixed "A" on the Diagram) and those of the Yelwa Town site, which was controlled for close-interval contouring.

As can be seen from Diagram B all but one of the N-S/APR lines were held by at least three and, in some cases four, such control zones, so that it was possible to reduce the line initially, using the terminal control only, and then to compare the APR values with the intermediate control. Barometric conditions during the survey were remarkably stable and Henry's formula when applied to the four or five APR strips having the greatest variation in the barometric pressure gradient gave a maximum irregularity of only $\pm$ 1 foot. The fact that the residuals at the groups of intermediate control points seemed to be entirely random was considered sufficient further evidence that no sudden changes occurred in pressure gradient along any strip.

The final adjustments made to the profiles were therefore carried out as linear corrections applied between the terminal control points with later datum corrections to minimise the small discrepancies at check points in the zones of intermediate control. The table below gives the distances bridged by the APR profiles and the mean residual errors at intermediate zones before datum correction :—

APR strip No.	Flying height in feet	Distance between terminal control in miles	Distance in miles to internal check control from southern end of APR strip		Mean Residual errors in feet at internal control zones	
			1	2	1	2
2/3	7,790	57	37	—	0	—
3/4	7,790	61	2	35	0	+ 3
4/5	8,500	61	34	57	+ 5	− 4
5/6	8,500	81	59	—	0	—
6/7	8,500	82	23	54	− 2	− 6
7/8	8,500	52	26	—	+ 6	—
8/9	10,000	45	13	—	0	—

After reduction of the APR strips, the corrected height values of the selected 35mm. p.ps. were used to set up the overlaps individually in a series of Wild A8 plotting machines on which the plotting of topographical detail and contours was carried out. It was soon discovered that by using the lateral APR lines (flown below 10,000 feet) the lack of sympathy between the control points used to set the overlap was seldom more than 3 feet whereas, directly the control obtained from the central (high level) profile was introduced, discrepancies of 10 feet or more were not infrequent and there was a general tendency for the central profile to read too high.

Of the high-level points showing unduly large errors one in every five proved to be due to "side-lobe" effect since, if readings were made over nearby water surfaces or damp ground instead of at the p.p. of the 35mm. photo, the read-off heights were then sensibly correct. At any particular flying height the effect of the side-lobe is to increase the area-spread, over which reflections are obtained by approximately 36 times. If the centre of the beam happens to fall on dry ground while a side-lobe impinges on water, the echo from the side-lobe is likely to be stronger than the vertical reflection, in which case the slope-distance of the side-lobe is recorded and not that of the centre of the main beam. For this reason, from 20,000 feet altitude, any readings taken within say 1,000 feet of a waterline are suspect and should be discarded.

Aircraft tilt will almost certainly have accounted for the greater share of the remaining errors (at 20,000 feet 1° of tilt will produce an error of 3 feet and 2° tilt an error of 12 feet).

Another correction to be made is for earth curvature which at an altitude of 20,000 feet will make the centre of the overlap 7 feet higher than the extreme corners and 4 feet higher than the corners of the normal working area. The tendency of the overlaps to set too high when including the results of the high-level profile may thus be accounted for by curvature effect.

With low-level APR each of these causes of error is greatly minimised. There will be moreover far more precise identification of the 35mm. p.p.s. on the survey photographs.

For these reasons it was decided to discard the results of the high-level APR altogether and to use only the points selected from the profiles running along the lateral overlaps of the survey photographs. This still left at least six points (three from each independent profile) on which to level any overlap. As an additional check there was the carry-forward from one overlap to the next.

Fifteen clear-cut cases of side-lobe effect were discovered also in the low-level APR, all in areas close to the river bank or in the margin between dry and damp ground. Another seven points which showed residual levelling errors between 10–40 feet proved on examination to fall on abrupt slopes or in clumps of dense trees and should therefore have been excluded during the earlier analysis of the 35mm. p.p.s. It is however important to note that all these 22 false values showed up "like sore thumbs" at the stage of setting the overlaps. Of the remaining 1,040 points used, the *maximum* residual error in the overlap was 7 feet and the r.m.s. error 2.1 feet. These are not of course absolute errors, but are an indication of the frequency and magnitude of random errors, besides demonstrating the high degree of sympathy held between groups of points taken from independent APR profiles.

Many of the overlaps contained points which had been identified on the photographs and spirit-levelled on the ground during the large-scale mapping at the dam site and of Yelwa Town. In addition there was continuous ground control all along the road strips which ran both sides of the river and often followed close to the limiting contour of the reservoir. Excluding the points which fell in the control zones, none of these additional levels were used in the initial setting of the overlaps but were held in reserve as an absolute check on the final accuracy of the work. In one or two cases very minor adjustments were made to improve the readings at these

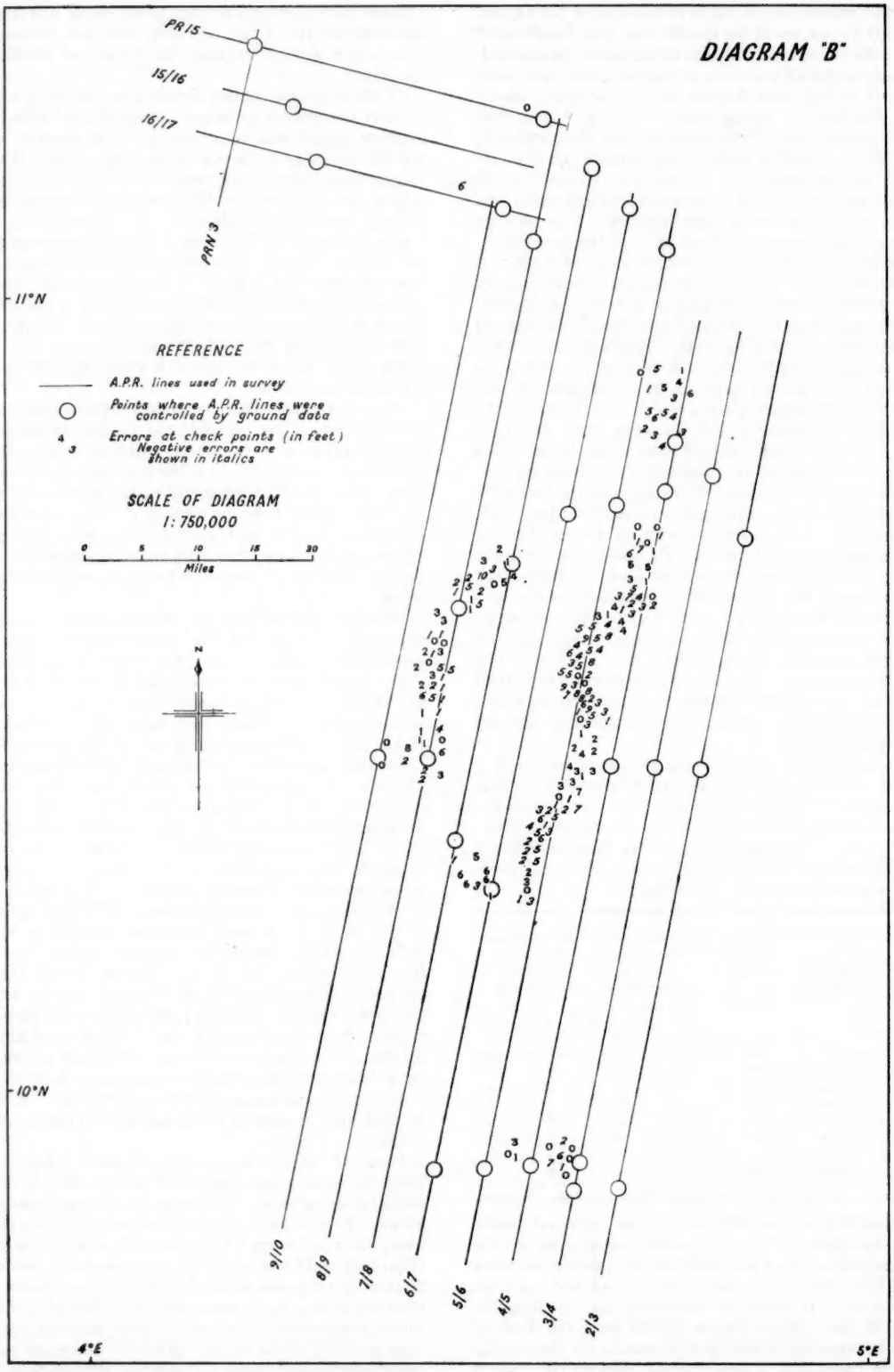
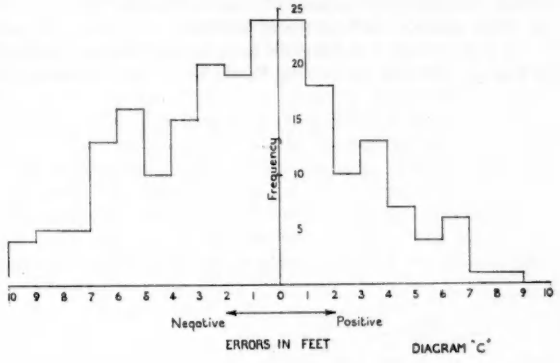


DIAGRAM "B"
PR/5
15/16
16/17
PRN 3
11°N
10°N
4°E
5°E
REFERENCE
A.P.R. lines used in survey
Points where A.P.R. lines were controlled by ground data
Errors at check points (in feet) Negative errors are shown in italics
SCALE OF DIAGRAM
1: 750,000
0 5 10 15 20
Miles
N
9/10
8/9
7/8
6/7
5/6
4/5
3/4
2/3

additional ground control points before plotting the contours but the errors listed in Appendix II and shown in Diagram B are those occurring when comparison was first made with the check levels. They may therefore be accepted as the absolute errors resulting from the use of APR with no other control than that provided at the points indicated in Diagram B.

The effect of the intermediate control zones has already been discussed (page 239, paragraph 3) and it has been shown that had these been omitted the result would not have been altered by more than about 3 feet at any point. Considering that the length of the APR bridges between the terminal control of the N–S strips varied between 36 and 82 miles, the result of this final analysis is highly encouraging. A total of 194 check readings were made spread over 41 overlaps and nine different strips. The mean square error of all readings was 4.2 feet. This included two extreme cases with errors of + 15 feet and − 16 feet ; both points fell near the centre of overlaps containing at least six other check points, none of which showed an error of more than 6 feet. It seems certain that the excessive error of the two points was due to misidentification and it is logical therefore to ignore these two points, in which case the mean square error of the remaining 192 points is reduced to 3.9 feet and the extreme errors are + 8 feet and − 10 feet. All readings were corrected for earth curvature, the maximum correction being 3 feet.

The distribution and frequency of these absolute errors is shown in Diagram C to be evenly divided between positive



Error in feet	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12
Frequency	24	18	10	13	7	4	6	1	1	0	0	0	0

Error in feet	0	−1	−2	−3	−4	−5	−6	−7	−8	−9	−10	−11	−12
Frequency	24	19	20	15	10	16	13	5	5	4	1	0	0

and negative values. It is also to be noted that 80 per cent of all check points lie within 5 feet of their true value.

The following facts about the survey are worth emphasis :—

(1) The APR control flying along the lateral overlaps of the survey photography was completed in five flying days out of a total of 19 spent on the whole operation.

(2) The ground levelling for controlling the APR profiles took 38 man-weeks compared with the estimate of 170 man-weeks required to provide normal height control for photogrammetric mapping.

(3) The contoured maps of the whole reservoir area were delivered within three months of completion of photography and APR flying and one month ahead of schedule.

(4) The total cost of the survey with APR control showed a saving of approximately 23 per cent over the estimated cost of undertaking the work without APR.

(5) Eighty per cent of the 192 points checked against ground levelling show no error greater than 5 feet and, excluding two misidentified points, 100 per cent were within 10 feet.

Conclusions

It is believed that this is the first APR survey to be undertaken on the African continent, and, more important, the first occasion when APR has been used as control for the contouring of a large area within such close limits of tolerance. It may therefore be of interest to sum up in general terms some conclusions reached from the results of the survey.

The most obvious, and the most important lesson, which has been learned, is the rapid fall-off in the accuracy of APR with altitude. In theory the tolerance for APR circuitry has been specified as 0.01 per cent (*i.e.*, ± 1 foot per 10,000 feet of flying height).* Because this figure is so small there has been a general belief that, provided the height chosen is free from local atmospheric disturbance, APR accuracy is virtually independent of flying height. While this may be true of instrumental accuracy, there nevertheless exist very considerable errors in the utilisation of APR which are most certainly dependent on flying height, and which may be summarised as follows :—

(1) *Misalignment of the radar axis with the optical axis of the positioning camera.*—On level or evenly sloping ground the height error caused by this will be directly proportional to the flying height.

(2) *Tilt.*—The effect of this has already been stated in the paper and will be directly proportional to the flying height on level ground or even slopes.

(3) *Spread of the APR beam.*—The height range of the terrain covered by the beam is proportional to the flying height if the ground slopes evenly.

(4) *Side-lobe effect.*—The diversity of reflecting surfaces encountered by the beam will vary with beam spread and therefore with the flying height. It follows that the greater the flying height the more likely is " side-lobe " effect to take place.

(5) *Identification.*—The greater the flying height the smaller will be the scale of the 35 mm. photography and the more difficult will be the identification of the profile on the ground.

From these considerations it is clear that the accuracy of APR control is very much dependent on flying height ; it will also vary with barometric conditions, terrain, vegetation, and quality of flying. Assuming entirely stable conditions, such as those occurring on the Niger Survey, one can attribute a C-factor to APR somewhere in the region of 500, although this may be rather too high for general use. When the APR factor is compared with the usual photographic C-factor of say around 1,000, it is seen that the APR record cannot normally give the required accuracy unless it is flown from half the altitude at which it is economic to carry out photography. APR flown simultaneously with photography will therefore only be practicable in circumstances when the vertical tolerance in the map contours is such that the flying

height deduced from the APR C-factor coincides with that of the service ceiling of the aircraft.

Fortunately the generalisation which has sometimes been made that " only if APR and survey photography are flown simultaneously can APR be economic " is not borne out by the results of the Niger Survey, nor is there any reason to believe that this will be so in other areas for the following reasons :—

(1) The additional cost of an aircraft unit fitted with APR and including the specialist to operate it, will not normally exceed 50 per cent of the standing charge and say 5 per cent of the hourly flying charge.

(2) Since APR can be flown at any height down to 4,000 feet, and the lower the better (subject only to absence of turbulence), and since small amounts of cloud can be tolerated on the 35mm. photography (*i.e.*, here and there a principal point may be lost), it follows that APR flying can often be carried out on days which are unsuitable for survey photography, when the aircraft would otherwise remain idle. A further economy can be introduced if the electronics engineer is prepared to serve as camera operator on days when the survey photography is being flown.

(3) By flying the APR control along the lateral overlaps of the survey cover instead of down the centre of the runs, it has been shown that the requirements for aerotriangulation (other than for purposes of scaling and for tie strips) can be eliminated, thereby effecting a major economy both in time and expense during the photogrammetric stage. (The " smoothing out " process whereby false APR readings are eliminated, takes place first during the analysis and reduction of the APR strips and secondly in the settings of the individual overlaps).

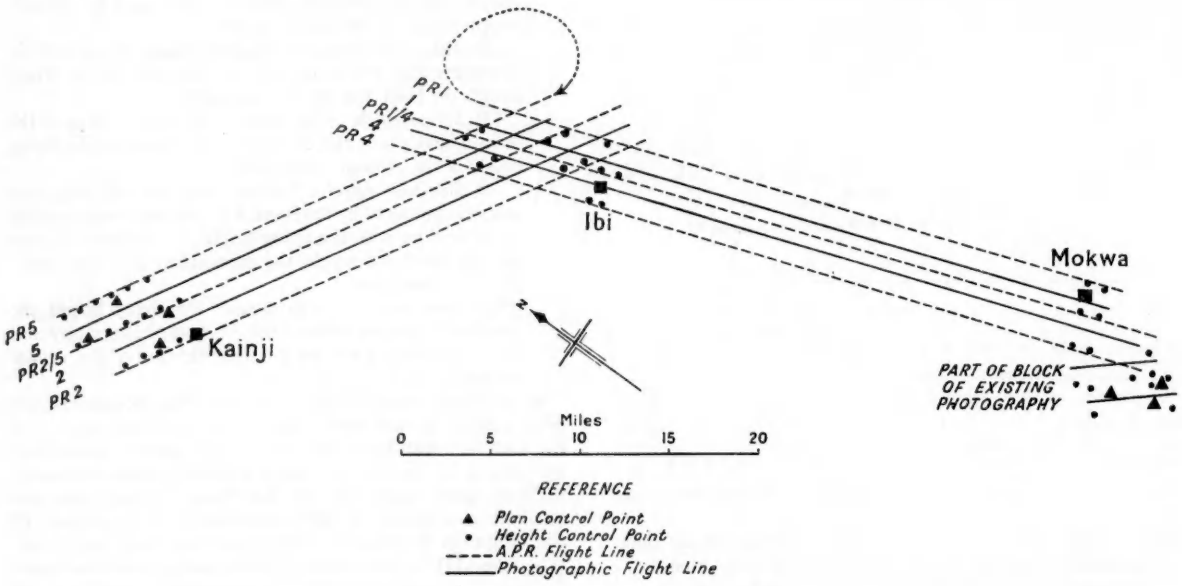
The results of the Niger Survey have demonstrated that (with APR control flown at the correct height along the lateral overlap) it is possible to span distances of 60–80 miles without intermediate ground control and still give no final height error on the map greater than 10 feet. The conditions under which this survey was undertaken were certainly not exceptional and there seems no reason to doubt that they were anything but average. If this fact be accepted then the argument in favour of APR control for mapping within the stated tolerance can hardly be disputed, taking into account the very large saving in time and cost over any other method.

Kainji-Mokwa Transmission Line Survey

During the flying of the reservoir survey, advantage was taken of the presence of the aircraft to photograph the route of a projected transmission line linking the dam-site at Kainji to the town of Mokwa, lying 20 miles north-east of Jebba. Some height control already existed at the two terminals of the line, sufficient to determine the line heights of the profile at these points. There was, however, no control of any kind along the remainder of the route until after the survey was completed, when a level line was run mid-way between as a check on the accuracy of the APR heighting.

The route was bent in the form of a dog's leg, and in order to achieve the necessary width of cover, a pair of parallel flight lines was provided extending from Kainji on one side and Mokwa on the other and intersecting roughly halfway between. As in the case of the reservoir survey, the APR lines were flown independently in four sorties from a mean flying height of 10,000 feet above ground ; one APR line along the lateral overlap of the Mokwa strips, one along the lateral overlap of the Kainji strip and the other four along the outer edge of the four photo strips.

For the reduction of the APR lines two controlled overlaps at Kainji were set up in the Wild A8 on existing ground



KAINJI - MOKWA
Flight Lines & Control Pattern

control, and heights given out to some half dozen 35mm. p.ps. of each profile, in order to establish the correct datum at the beginning of the profile. Similar corrections were made at the Mokwa end. The six APR lines were, therefore, held at one end only.

The next step was to set up overlaps in the area of intersection of the four photo strips using the provisionally adjusted APR values for setting, and then to read out photogrammetric spot heights corresponding to the 35mm. p.ps. of the other strips. A simple linear adjustment was then made to each profile to reduce the arithmetic sum of the nine misclosures to zero. It was found that the average correction made to each profile in the intersection area was only 4 feet and the maximum 8 feet.

Since the strips had to be aerotriangulated for plan control, it was possible throughout the length of each strip to adopt a smoothing technique for the selected APR heights. Using the Wild A7 for the aerotriangulation, groups of 3 or 4 spot heights on alternate overlaps were read out, corresponding to the locations of the 35mm. p.ps. Differences between the unadjusted photogrammetric readings and the corresponding APR heights were then plotted as graphs, and smooth correction curves drawn through the centre of gravity of each group of points. It was found that individual points were seldom as much as 10 feet off the correction curve and usually within 4 feet.

While this procedure was being carried out in the photogrammetric laboratory, a further level line was run on the ground to contain the intersection area of the four photo strips. The overlaps containing these control points were then reset in the plotting machine and it is of interest to record that the common check points at the uncontrolled ends of the strips showed no error exceeding 5 feet.

Unlike most of the reservoir area, the country in this case was heavily treed with close African bush but this appears to have had very little effect on the penetration of the APR beam. It is probable that only in the case of dense tropical jungle will the penetration of the beam be seriously affected.

These two separate projects demonstrate the high accuracy achievable by APR when flown at relatively low altitudes and independently of the survey cover. They also substantiate the great saving particularly in time but also in cost which can be made by the application of this new and important tool in areas of difficult terrain and where existing control is sparse or non-existent.

It has been suggested that the conditions met with in Nigeria were exceptional and that one could not expect to obtain the same standard of accuracy in areas of more rugged terrain. It should be taken into account, however, that in areas where the terrain relief is large, the interval of map contours is necessarily increased and, therefore, the tolerance in the accuracy requirements of height control points is correspondingly wider—one factor to a large extent compensates for the other. In conditions of turbulence one would not of course operate with the APR, any more than one carries out geophysical flying during a magnetic storm.

So far as the nature of the ground was concerned, the Kainji Reservoir area was very far from being ideal owing to the large number of water surfaces which gave false echoes, while the Kainji/Mokwa strip, as has been shown, was completely covered by trees.

In the past two months we have been flying APR in another completely different part of Africa and the conditions there have certainly proved no more difficult than those met with in Nigeria. There is, I suggest, no reason therefore to suppose that APR will not work equally well in other types of terrain, except possibly in areas of dense tropical jungle where any method of accurate contouring is likely to prove impracticable.

ACKNOWLEDGMENT

The author is much indebted to the Federal Government of Nigeria, the Electricity Corporation of Nigeria, and Messrs. Balfour, Beatty for permission to publish this report, and to the aircrew and photogrammetric specialists responsible for carrying out the work, who have contributed the majority of the information contained in the paper. Particular mention should be made of Mr. K. Keir who has been in charge of the compilation and analysis of the results, Mr. T. Hedges who was responsible for the operation of the electronic equipment, Mr. E. Green who carried out the navigation of the aircraft, and not least Mr. R. V. Keeling, the Expedition Manager who piloted the aircraft.

* "The Radar Profile and its Application to Photogrammetric Mapping." T. J. Blachut & R. D. Leach—Div. of Physics N.R.C. Canada.

NOTE : *Diagrams A and B have been reduced slightly from the original drawings : the representative fraction should therefore be discounted.*

APPENDIX I

DETAILED INFORMATION ON OPERATING CONDITIONS AND DATA

Latitude	9° 45′ N—11° 15′ N
Height range	130′ (within mapping area) 880′ (within area covered by APR)
Terrain	Flat or gently undulating, occasional steeper slopes away from river.
Vegetation	33 per cent bare 30 per cent scrub covered 35 per cent very light forest 2 per cent medium or dense forest
Cameras	Wild 6″ Aviogon RC5 and RC8
Flying heights (photographic runs)	Runs 1–17 (mapping cover) 20,500′ Tie run N1 20,500′ Tie run 1 9,000′ Tie runs 2 and 3 9,500′ Trig identification runs—usually 7,500′
*(Existing cover not flown specifically for this job, but nevertheless used for controlling APR lines)	Control strips 10–25 5,000′ Control strips 26–30 3,300′ *Control stips prefixed " A " 3,000′ *Control strips at Yelwa 3,000′
	Datum point runs at various heights
Flying heights (APR runs)	Runs 2/3 and 3/4 7,800′ Runs 4/5–7/8 8,500′ Runs 8/9 and 9/10 10,000′ Runs PR15, 15/16, 16/17 6,400′ Runs PRN3 6,400′
Operating dates (APR runs)	8/10/59–27/10/59
Operating times (APR runs)	0800–1200 GMT (increased turbulence and formation of cumulus in afternoons)
APR lines used for control	2/3–9/10 15/16 and 16/17 PR15, PRN3
APR tape speed	11″ per minute, constant

Mileage of APR runs used for control	c. 1700 miles
T.A.S. on APR runs	121–154 knots
Drift on APR runs	11°N–10½°S
Maximum variation of T.A.S. on any 1 APR run	5 knots
Maximum variation of drift on any 1 APR run	Of the order of 2°–3°
Winds	Generally 10–15 knots at 20,000′
Hypsometer warming-up period	Always 1½ hours (during transit from base at Kaduna)
Nearest met. station	Kano
Pressure conditions	Constant over any 100 miles distance
Diurnal change	At Kaduna airfield level, +120′ between 0600–1200 GMT
Velocity of propagation of beam	Different from U.K., but insignificantly so
Lengths of APR lines	Lines 2/3–9/10 90 miles each Lines 15/16 and 16/17 30 miles each Lines PR15 and PR17 30 miles each Line PRN3 15 miles Tie runs 1, 2, 3, and N1 45 miles each
Drift rate between datum points	17–28 ft. per hour, in negative direction (agrees with typical diurnal barometric changes). Same drift rates apply at both 20,000′ and at 6,000′ –8,000′
Survey Camera exposure interval (1/40,000 cover)	c.45 secs.
35 mm exposure interval	c.7 secs.
Maximum lateral tilt	1½°
Maximum F & A tilt	1½°
Maximum inclination of airbase	48 minutes
Maximum change of flying height between two exposures	160′

APPENDIX II

Strip	Overlap	Point No.	Ground Height	Machine Height	Error	Curvature Correction	Residual Error
3	5010–1	K 48	486	486	0	0	0
3	5011–2	K 66	404	404	0	0	0
		K 84	453	453	0	0	0
3	5012–3	K 82	443	443	0	0	0
4	4863–4	K 92	546	548	+2	0	+2
4	4864–5	K 66	404	397	−7	+1	−6
		K 32	367	362	−5	−2	−7
		K 75	462	462	0	+1	+1
4	4866–7	K 48	486	484	−2	0	−2
		K 42	416	419	+3	−3	0
5	4444–5	HP 125	523	530	+7	−1	+6
		126	489	496	+7	−2	+5
		127	533	538	+5	−1	+4
		128	510	512	+2	−1	+1
		130	483	480	−3	−2	−5
		Anthill	462	462	0	0	0
5	4445–6	HP 121	493	488	−5	−1	−6
		124	544	541	−3	−1	−4
		125	523	521	−2	−1	−3
		126	489	490	+1	−2	−1
5	4446–7	HP 114	533	530	−3	−1	−4
		118	470	470	0	−3	−3
		119	452	453	+1	−3	−2
		122	462	459	−3	−3	−6
		121	493	490	−3	−2	−5
		116	581	578	−3	0	−3
5	4450–1	615	502	502	0	−1	−1
		616	496	499	+3	−2	+1
		617	539	539	0	−1	−1
		618	497	500	+3	−3	0
		619	523	525	+2	−2	0

Strip	Overlap	Point No.	Ground Height	Machine Height	Error	Curvature Correction	Residual Error
5	4451–2	610	476	482	+6	−1	+5
		611	505	507	+2	−2	0
		612	535	530	−5	−2	−7
		613	499	500	+1	0	+1
		614	494	499	+5	0	+5
		615	502	503	+1	−1	0
5	4452–3	608	486	491	+5	−2	+3
		609	500	501	+1	0	+1
5	4453–4	597	487	487	0	−2	−2
		598	457	464	+7	−3	+4
		599	477	478	+1	−2	−1
		600	462	461	−1	−2	−3
		601	499	487	−2	−1	−3
		602	477	471	−6	−1	−7
		603	488	487	−1	−1	−2
		604	514	510	−4	0	−4
		605	531	530	−1	+1	0
		606	512	509	−3	+1	−2
		607	486	481	−5	0	−5
5	4454–5	590	625	621	−4	−1	−5
		591	577	573	−4	−1	−5
		592	525	523	−2	−2	−4
		593	517	522	+5	−2	+3
		594	475	482	+7	−3	+4
		595	468	474	+6	−2	+4
		596	484	487	+3	−2	+1
5	4455–6	584	478	473	−5	+1	−4
		585	494	490	−4	0	−4
		586	530	523	−7	+2	−5
		587	520	517	−3	−1	−4
		589	568	558	−10	+1	−9

APPENDIX II—*continued*

Strip	Overlap	Point No.	Ground Height	Machine Height	Error	Curvature Correction	Residual Error
5	4455–6	590	625	618	−7	−1	−8
		591	577	568	−9	0	−9
5	4456–7	560	479	471	−8	0	−8
		561	432	429	−3	0	−3
		563	469	467	−2	0	−2
		564	454	448	−6	+1	−5
5	4456–7	580	506	499	−7	−1	−8
		584	478	469	−9	+1	−8
		579	495	488	−7	0	−7
5	4457–8	548	480	473	−7	−2	−9
		558	467	463	−4	−2	−6
		559	519	519	0	−3	−3
		560	579	569	−10	+1	−9
		561	432	431	−1	+1	0
		579	495	489	−6	−1	−7
		580	507	506	−1	−1	−2
5	4458–9	546	447	448	+1	−2	−1
		545	445	448	+3	−3	0
		547	464	461	−3	−2	−5
		549	468	467	−1	−2	−3
		550	475	477	+2	−3	−1
		544	442	442	0	−3	−3
		542	444	448	+4	−3	+1
		543	442	447	+5	−3	+2
5	4459–60	541	441	446	+5	−3	+2
		540	438	445	+7	−3	+4
		539	437	441	+4	−2	+2
		538	425	431	+6	−2	+4
5	4460–1	537	434	439	+5	−2	+3
		535	437	441	+4	−3	+1
		536	436	441	+5	−2	+3
		534	439	448	+9	−2	+7
		569	414	419	+5	−2	+3
		533	414	419	+5	−2	+3
5	4461–2	526	436	431	−5	0	−5
		527	439	437	−2	0	−2
		528	414	411	−3	+1	−2
		529	423	422	−1	0	−1
		531	443	444	+1	−2	−1
		532	418	418	0	0	0
5	4474–5	K 40	494	499	+5	−2	+3
		K 75	462	462	0	0	0
6	4294–5	581	464	462	−2	−3	−5
		582	461	460	−1	−2	−3
		583	483	479	−4	−2	−6
		564	454	456	+2	−2	0
		565	454	451	−3	−2	−5
6	4300–1	527	439	431	−8	0	−8
		526	436	431	−5	−1	−6
		528	414	412	−2	−2	−4
		525	415	416	+1	−2	−1
		524	415	413	−2	−2	−4
		523	428	426	−2	−1	−3
		522	415	411	−4	−2	−6
		521	417	412	−5	−1	−6
6	4301–2	520	407	408	+1	−3	−2
		519	420	418	−2	−3	−5
		518	406	407	+1	−3	−2
		571	419	416	−3	−2	−5
		570	401	402	+1	−3	−2
6	4302–3	530	423	421	−2	0	−2
		516	413	417	+4	−2	+2
		517	413	418	+5	−2	+3
		515	407	404	−3	0	−3
		514	405	406	+1	−1	0
		513	400	400	0	−1	−1
7	4502–3	HP 6	415	415	0	+1	+1
		7	416	424	+8	−2	+6
		8	419	427	+8	−2	+6
		10	444	443	−1	−2	−3
		11	472	480	+8	−2	+6
		12	495	503	+8	−2	+6
		13	405	411	+6	−1	+5
		14	451	451	0	−1	−1
8	5288–9	HP 59	444	444	0	−2	−2
		58	464	465	+1	−3	−2
9	5045–6	HP 40	535	539	+4	−2	+2
		43	486	488	+2	−2	0
		38	489	483	−6	+1	−5
		39	460	457	−3	+1	−2
		42	419	412	−7	+1	−6
9	5046–7	HP 43	486	489	+3	−1	+2
		47	468	472	+4	−2	+2
		46	480	481	+1	−2	−1
		45	425	426	+1	0	+1
		44	428	427	−1	0	−1
		42	419	421	+2	0	+2
15	4566–7	OXBOW	547	547	0	0	0
16	4377–8	YB601	615	610	−5	−1	−6
8	5287–8	HP 76	516	522	+6	−3	+3
		75	565	570	+5	−3	+2
		74	586	585	−1	−2	−3
		60	599	602	+3	−2	+1
		72	559	564	+5	0	+5
		73	597	600	+3	+1	+4
8	5288–9	HP 57	504	504	0	−2	−2
		61	503	505	+2	−2	0
		62	517	510	−7	−3	−10
		56	464	461	−3	−2	−5
8	5289–9	HP 50	548	549	+1	+2	+3
		55	516	516	0	−1	−1
		54	433	437	+4	−3	+1
8	5289–9	HP 56	464	468	+4	−3	+1
		59	444	440	−4	−1	−5
8	5290–1	HP 45	425	424	−1	0	−1
		53	554	557	+3	0	+3
		51	536	539	+3	0	+3
8	5291–2	HP 42	418	418	0	0	0
		44	428	425	−3	0	−3
		45	425	425	0	0	0
8	5292–3	HP 38	489	489	0	−1	−1
		39	460	460	0	−1	−1
		42	419	412	−7	+1	−6
8	5293–4	HP 36	479	480	+1	−2	−1
		37	516	516	0	+1	+1
8	5294–5	HP 33	474	472	−2	−2	−4
		32	437	439	+2	−2	0
		34	510	510	0	+1	+1
		35	529	529	0	+1	+1
8	5295–6	HP 25	447	449	+2	−1	+1
		26	423	428	+5	−2	+3
		27	433	431	−2	0	−2
		28	419	417	−2	0	−2
		30	590	591	+1	0	+1
		31	484	480	−4	−2	−6
9	5042–3	505	482	482	0	−2	−2
		506	571	581	+10	−2	+8
		507	475	475	0	0	0
		509	445	445	0	0	0
9	5045–6	HP 41	544	539	−5	−1	−6

Rating Surveyor's Diary

COMPILED BY H. HOWARD KARSLAKE (F) DIPLOMA IN RATING

COURT OF APPEAL

PUBLIC OCCUPATION

Irrelevance of Irrevocable Statutory Dedication

Blake (*VO*) v. *Hendon Corporation.*
(14, 15, 20, 21, 22 June, 28 July, 1961)

A local authority purchased land for use as " public walks or pleasure grounds " under powers contained in section 164 of the Public Health Act, 1875, but were not required by the conveyance to maintain and use it in perpetuity for that purpose under the section. They maintained and used it as a public park of which the public had free and unrestricted use.

Held : The park was not in the beneficial occupation of the local authority but was in the beneficial ownership of the public, because :—

(i) it was sufficient for this purpose that land acquired under the section was being used for the purposes set out in it and that the public had free and unrestricted use of it, and a formal act of dedication was unnecessary :

Lambeth Overseers v. *London County Council* applied ;

North Riding of Yorkshire County Valuation Committee v. *Redcar Corporation* distinguished ;

(ii) the powers of selling and letting the park possessed by the local authority, in particular under section 164 of the Local Government Act, 1933, and section 76 of the Public Health Act (Amendment) Act, 1907, were subordinate and supplementary to the main power of using the park for the public under section 164 of the 1875 Act,

Liverpool Corporation v. *West Derby Assessment Committee* applied.

Per Devlin L.J.—

" . . . In our judgment there is no true distinction between this case and the *Brockwell Park* case. Neither can the present case be satisfactorily distinguished from *Sheffield City Council* v. *Tranter* (*VO*) . . . there is no need for the corporation to obtain a finding of fact in the case that an act of dedication has taken place. It is sufficient . . . that land acquired by a local authority under section 164 of the 1875 Act is being used by the public for the purposes set out in that section and that it has free and unrestricted use of it (qualified, it may be, by a limited exclusion for ancillary purposes) for those purposes . . .

Rateability Depends on Fact, not on Law

" Of course, if the exclusion of the public from free use goes beyond what is justifiable as ancillary, the land or the parts of it subject to the exclusion, will be rateable on the ground that they are no longer beneficially occupied by the public but are being occupied by the local authority for their own purposes. That is what happened in *North Riding of Yorkshire County Valuation Committee* v. *Redcar Corporation* . . .

" The legality or the illegality of what the corporation were doing was not strictly relevant. Rateability depends on how the land is in fact being used, not on how it ought to be being used . . .

" As the law stands at present, there must inevitably be a difference for rating purposes between a public park and a public art gallery. But that at least is a difference which can be stated in a way which is intelligible to the ordinary man, even if he does not pretend to understand the reasoning behind it. . . ."

[1961] R.V.R. 552

INDUSTRIAL DERATING

Reconditioning of Vehicle Components

East Yorkshire Motor Services Ltd. v. *Clayton* (*VO*).
(27, 28, 29 June, 20 July, 1961)

A bus company occupied premises for two purposes : (i) the remaking or reconditioning of parts or units of vehicles, which parts or units had mostly been dismantled at local service depots and sent to the premises for the purpose and were subsequently stored for use as spare parts for replacements for vehicles ; (ii) the repair and maintenance of the company's road vehicles, this occupying a rather smaller area than the reconditioning process and employing 27 persons as compared with 35. Particulars of the nature, extent and value of the work done were also before the court.

Held : The workshop was an industrial hereditament as defined in section 3 (1) of the Rating and Valuation (Apportionment) Act, 1928, because :

(i) the reconditioning of parts or units of vehicles was an industrial process and was not " the maintenance of . . . road vehicles " deemed not to form part of a factory and so not an industrial process under section 3 (2) (*b*), even though some parts reconditioned there were drawn from stock for maintenance of vehicles on the premises ;

Bailey v. *Potteries Electric Traction Co., Ltd.* applied ; and

(ii) the premises were not primarily occupied and used for non-factory purposes under section 3 (1) (*f*), *i.e.*, the maintenance of road vehicles, the area used for which fell to be taken into account for this purpose, although deemed not to form part of the factory under section 3 (2) (*b*).

Per curiam: (1) The fact that a hereditament or part thereof is used for or in connection with the maintenance of road vehicles to an extent exceeding *de minimis* does not *ipso facto* make the hereditament or part a " place used . . . for . . . the maintenance of . . . vehicles " within section 3 (2) (*b*), unless it is substantially so used.

(2) The practice of appending a transcript of the evidence of a witness to a case stated by the Lands Tribunal for the decision of the Court of Appeal is undesirable and all the necessary facts should be found in the case.

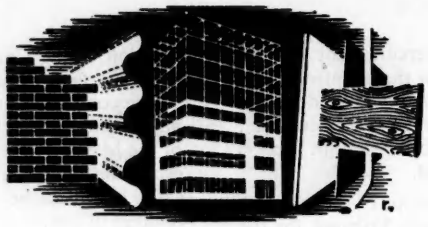
The convenient practice of incorporating in the case stated any decision of the tribunal in accordance with the direction of the Master of the Rolls on 27 July 1956, did not alter this established practice and the direction expressly referred to cases in which the written decision contained all necessary findings of fact. [1961] R.V.R. 584

LANDS TRIBUNAL: PERSONAL APPEARANCES*

Ratepayers in Dwelling-house Appeals

Parties and Hereditament	Gross Value		Points Raised	Costs Awarded
	Under Appeal	Determined		
	£	£		
Aldcroft v. Allan (VO) (*Mr. John Watson*, 17 *July* 1961) New house and garage in Chester (as determined by LVC, confirming VO's proposal)	56	53	Lack of privacy from neighbour's garage Appeal allowed	1 gn.
Corner v. Melville (VO) (*Mr. R. C. G. Fennell*, 24 *July* 1961) Agricultural dwelling-house, Leeds (as determined by LVC on VO's proposal to increase from £20 to £38) ...	33	33	Conversion, additions and improvements ; Price per foot E.F.A. Appeal dismissed	3 gns.
Daws v. Watson (VO) (*Mr. John Watson*, 17 *July* 1961) House and shop in Wotton-under-Edge (as confirmed by LVC on ratepayers proposal to split assessment) ...	55	55	Upper part empty, but with access only through ground floor shop ; Cases referred to :— *Allchurch* v. *Hendon* (1891) *R.* v. *Aberystwyth* (1808) Held to be a single hereditament. Appeal dismissed	3 gns.
Lewis v. Holman (VO) (*Mr. John Watson*, 17 *July* 1961) House and garage at Rickmansworth (as reduced from £95 on ratepayer's proposal)	90	70	" Eyesore " of new development ; nuisance caused by use of nearby land as contractors' site Appeal allowed	2 gns.
Lewis-Williams v. Hoggett (VO) and Cheltenham Boro. Council (*Mr. R. C. Walmsley*, 10 *August* 1961) New house and garage in Cheltenham (as determined by LVC on VO's proposal for £60)	52	49	Comparison with council houses ; nuisance from industrial noise ; Temporary disabilities (lack of central heating—proximity of contractors' huts) ; Price per foot of E.F.A. Case referred to :— *Taunton Boro. Council* v. *Sture* (*VO*) Appeal allowed	½ gn. against each respondent
Pitman v. Harvey (VO) (*Mr. John Watson*, 17 *July* 1961) House and car-shelter at Braintree (as increased from £12 on VO's proposal to which ratepayer did not object) ...	15	14	Basic valuation—lack of services—value of car-shelter Appeal allowed	No costs
Russell and others* v. Thomas (VO) (*Mr. R. C. Walmsley*, 6 *July* 1961) Ten detached houses in Lichfield (as confirmed by LVC)	601 (Total of 10	558 assessments)	Abnormal increase in traffic due to new by-pass round-about Cases referred to included :— *Shalders* v. *Letherland* (51 R & IT 330) *Dobell* v. *Tomlinson* (51 R & IT 793) Appeals allowed	County Court Scale 3
Sims v. Scudamore (VO) (*Mr. John Watson*, 24 *July* 1961) House in Southampton (figure in list, as confirmed by LVC)	46	46	Nuisance from van-parking by neighbour Appeal dismissed	No order

* Except in the Lichfield Appeals, all the ratepayers appeared in person



BUILDING AND QUANTITY SURVEYING

The Use of Computers for Working Up

The following is the report of a Working Party formed in February 1961. *The report was presented at a QS meeting on* 18 *October. The Working Party comprised Mr. C. A. Wales (Chairman), Messrs. W. S. Kirkby, B. W. Millhouse, S. P. Simcocks and Martin Sheffield (Honorary Secretary).*

1. Terms of reference

The Quantity Surveyors' Committee of the RICS in September 1959 endorsed the appointment of a Working Party to consider and report on the possible place of computers in quantity surveying practice. A further Working Party was formed in February 1960 to deal with one facet of the investigation, namely, " to look into the possibilities of the use of computers in connection with the working up of quantity surveyors' dimensions " and to report to the main Working Party.

2. Interim Report

As members of this latter Working Party we submitted an Interim Report dated 29 August 1960 which was published in *The Chartered Surveyor* of April 1961. We are not repeating in this report the matters dealt with therein except in so far as further study has clarified and in a few cases amended the preliminary conclusions reached.

3. Research by others

We understand that research into data processing techniques has been and is being pursued by others, but so far little information as to methods has been released to us. In one case, where research has been going on for some time, the intention is, we understand, to offer a data processing working-up service to the profession on a commercial basis.

4. Further research by the Working Party since the issue of the Interim Report

As indicated in section 15 of the Interim Report we have pursued research as follows :—

(i) The format of a library of standard descriptions sufficient only to test the system.

(ii) A coding system for standard descriptions and variables and dealing with non-standard descriptions.

(iii) The technical problems in collaboration with organizations which already have computers and with manufacturers.

(iv) The use of various types of equipment to assess which offer most promise.

(v) The financial aspect.

We give our conclusions in the sections which follow.

5. Library of Standard Descriptions

(1) In our interim report we estimated that the " library " of standardised descriptions would want for a start about 25,000 items including standard variables. This is probably a minimum figure and pre-supposes that coding will generally employ the " representative coding " system. For the purpose of the estimates of cost we have taken a figure of 50,000 as the number of items in the library sequentially coded or parts of items, represented by a single significant digit, where representatively coded. If coding is by a simple " sequence " numbering method (e.g. as is used for the War Department's " Schedule of Prices for Works and Repairs to Buildings, etc.") or by " block " coding the number of items would be very greatly increased.

(2) The percentage of non-standard or " rogue " descriptions that occur will decrease with an increase in the size of the " library ", but not in direct inverse proportion. Whilst we are thinking in terms of about 10 per cent for an average job it will be a matter for careful research into the economics of data processing to determine the optimum size of the library in relation to the proportion of " rogues ".

(3) We consider it desirable for technical reasons that descriptions in the body of a bill of quantities should be kept as short as practicable and for much of the detail to be given in the " preambles " to which the description will refer.

(4) Whilst it may not be impracticable for large firms of quantity surveyors and official departments to prepare their own libraries, smaller firms might find the cost of doing so quite prohibitive. To obtain the maximum benefit from data processing a library of standard descriptions and a standard system of coding should be prepared for, and adopted by, the profession as a whole.

(5) Every endeavour should be made for the library to be as comprehensive as practicable yet sufficiently flexible for changes in building materials and techniques to be incorporated as they arise.

(6) Separate libraries will be necessary according to methods of measurement. The main methods of measurement in use today in the United Kingdom are based upon :—

1. The Standard Method of Measurement of Building Works.

2. The Scottish Mode of Measurement.

3. The Standard Method of Measurement of Civil Engineering Quantities.

4. The Code for the Measurement of Building Work in Small Dwelling Houses.

(7) We understand there might well be financial and other advantages in having both the typescript and magnetic film or tape versions of the library also in abridged form. Both the abridged and full forms should have the same coding but the former could be used perhaps for simple work of a traditional character. Using the abridged library there would be a greater proportion of " rogue " descriptions but this might be more than compensated by savings elsewhere.

(8) An example of " a bed of concrete " based upon the Standard Method of Measurement of Building Works and the principle of short descriptions is given in Appendix I.

6. Coding

(1) In order to reduce the bulk of the standard library, and thus the time spent in coding, we consider that " representative " codes as in Alternative II of Appendix I will be found preferable and resort made to " sequence " or " block " codes only where fully representative coding would produce a code having an undue number of digits.

(2) In any system of coding provision must be made for additional items to be inserted in any position in the library as occasion arises.

(3) We consider the best person to do the coding is the taker-off, although later on this may be varied by individual office practice.

(4) For a start a taker-off may write his descriptions in full on the dimension sheets without much reference to the library. In the course of time, however, when the library becomes well known and the frequently used items memorised, the taker-off may write just brief descriptions plus the code number. Coding may then actually speed up taking-off rather than delay it. The use of standard descriptions will certainly ease the task of editing the draft bill.

7. Data processing without the use of a standard library

(1) It is quite practicable to use data processing for final account work (whether by complete remeasurement or by variations on the " add and omit " basis), certificate valuations, etc., without employing a standard library ; and it has been done. The original bill of quantities or schedule of rates forms an *ad hoc* library with the item reference used as a simple sequential block code.

(2) Methods have also been investigated by which original bills of quantities can be produced by an *ad hoc* coding of the descriptions on the dimension sheets.

(3) We do not consider such methods show much promise and we unhesitatingly recommend the profession to adopt a fully integrated data processing system employing standard libraries particularly in view of the wider implications of data processing referred to in section 12.

8. The various types of data processing equipment

(1) Present day data processing equipment ranges from the relatively simple punched card machines with electric calculators and mechanical or electro-mechanical sorting and collating right through to elaborate computer equipment. Nowadays using transistors instead of electronic valves the physical size of computers has been drastically reduced and a computer of adequate capacity for our work and its ancillary equipment is in the same order of size as a suite of office furniture.

(2) What combination of equipment should be used depends primarily on economic considerations. It does not by any means follow that the relatively inexpensive all card equipment is cheaper in the long run than a relatively expensive computer. It all depends on using expensive equipment as near to its full capacity as possible and this is where the service bureau comes into its own.

(3) The three firms who have collaborated with us in our investigations have all come to the conclusion that an all punched card system is impracticable and uneconomic for a data processing system employing a standard library of the size envisaged and recommend the use of a computer ; the whole library can then be stored on a few reels of magnetic film or tape instead of on hundreds of thousands of punched cards. One firm proposes the use of punched papertape for input with sorting into code sequence in the computer : the other two firms propose punched manilla cards for input with electro-mechanical sorting into code sequence before feeding the data into the computer.

(4) Both methods we consider show considerable promise and warrant further investigation.

(5) For descriptions of the systems investigated see Appendix III.

9. The accuracy of data processing

(1) We are assured that the accuracy of the machine processes is very high indeed. No machine is, however, perfect but in the rare instances when faults do develop the result will most likely be mere gibberish. By regular testing and the replacement of assemblies not fully up to test standards the chances of faults occurring in operational use are we are assured, reduced to a minimum. The use of transistors instead of electronic valves in computers has, we understand, improved reliability.

(2) The manual processes are, as always, subject to the human element. The coding, which we envisage being done by the taker-off, will require checking before the dimensions are processed. With a " sequential " or " block " code there is an almost foolproof automatic check by means of a " check digit ", but this is not possible using a " representative " code without listing every possible combination in the typescript version of the library and which would make it unmanageably large. Similarly the size of the typescript version of the library, if using sequential coding will probably rule out the general use of this method and most coding will need be representative.

(3) The keying of the dimensions to form the input into the machine can be made almost 100 per cent accurate by the standard practice of two operators keying independently. Nevertheless errors by misreading bad writing can occur but the danger should be no greater than with manual working-up.

(4) It should also be possible to introduce an overall feasibility check by linking each dimension through the " indicator " in the code with its location in the building (e.g. external wall, floor, roof, etc.) and comparing the totals so recorded with the total areas measured independently. This is in effect an extension of the normal process of editing a draft bill.

(5) By the adoption of these techniques with data processing the result should be a bill of quantities with less possibility of error than with the traditional system of working-up.

10. The economics of data processing

(1) The data processing system we envisage will involve costs under the following main heads :—

(A) *Initial costs*

(i) The compilation of a typescript library(ies) of standard descriptions.

(ii) Coding the library(ies).

(iii) Preparation of library tapes or films.

(iv) Programming the computer(s) and test running.

(B) *Periodic costs*

Periodical amendment of the above by reason of :—

(*a*) Changes in methods of measurement.

(*b*) New materials and building techniques.

(C) *Running costs*

Either as (i) Payment on a job basis to a service bureau; or

(ii) (*a*) Amortization of capital costs of purchase of equipment or hire purchase or hire charges.

(*b*) Maintenance of equipment.

(*c*) Stationery, etc.

(*d*) Salaries and wages.

(*e*) Rent, rates, heating, lighting, etc.

(*f*) Overheads.

(2) The initial costs (A) are likely to be heavy and we strongly recommend the adoption of uniform standard libraries prepared and coded on the basis of a uniform data processing system for the whole profession. By so doing all will gain as not only will these initial costs be widely shared but there would be better latitude for having data processing carried out elsewhere should any organisation be overloaded with work at any time. It will also have the great advantage—and this we consider most important—that in due course data processing for the building and civil engineering industries might be fully integrated with that for the quantity surveying profession (see section 12).

(3) As mentioned in section 13 of our Interim Report we do not consider that even the largest quantity surveying firms will find it worth while to install other than input equipment in their own offices. Furthermore, this is a new industry, equipment is constantly being improved and a purchaser may soon find his equipment is obsolescent.

(4) In any case we recommend that firms should gain experience with data processing by using a service bureau before installing their own equipment.

(5) The financial estimates of 10(1)(A), (B) and (C)(i) are given in Appendix IV.

(6) We have not attempted to assess the extra costs or savings by reason of :—

(*a*) The use of a standard library.

(*b*) The coding of dimensions.

(*c*) Dealing with rogue descriptions.

(*d*) The editing of the machine draft bill.

(*e*) Dealing with certificate valuations and final accounts.

These are the main changes in the quantity surveyor's office which will arise from data processing and it would seem that to some extent extra costs may balance savings. It is a matter, we feel, for individual judgment when deciding whether or not to change over to data processing.

11. Service Bureaux Generally

(1) The alternative to the individual firm or department having its own equipment and directly employed data processing staff is for them to :—

(A) Share such staff and equipment between several offices in the same locality ; or

(B) Employ the manufacturers' service bureau(x) ; or

(C) Employ a commercial bureau(x) that may be set up to serve the quantity surveying profession; or

(D) Use a bureau set up by the profession itself.

(2) In the sections which follow are our views as to these various methods.

(A) *Sharing of Data Processing Staff and Equipment*

(i) It is most unlikely that the volume of work of a group of even large firms would make economic the exclusive use of a computer. The most likely set up would be the co-operative employment of key punch and supervisory personnel, the exclusive use of input equipment, but buying computer time as required. Even so the chief difficulty appears to be in so organising the work that the staff and input equipment are continuously employed.

(ii) The big drawback to even a large firm having its own input equipment, and one which we feel far outweighs the possible financial advantage, is the dependence on one or two key personnel. Quite apart from other difficulties there is always the possibility, even the certainty some time or another, of illness which could seriously delay the work as it is unlikely that a skilled replacement could be found at short notice. Furthermore, unless the data processing techniques adopted were exactly in accord with the standard of the profession it would not be possible to call upon the services of a bureau in case of such emergency.

(B) *Service Bureaux run by Manufacturers of Equipment*

(i) Some of the larger firms manufacturing data processing equipment run service bureaux in London and in certain of the larger provincial centres.

(ii) One of the initial difficulties in using these is that the key punch operators at present employed are normally used to handling data set out in a specific format quite different from that of quantity surveyors' dimensions. If the volume of quantity surveying work handled by the bureau(x) grows sufficiently this difficulty will no doubt correct itself as key punch operators become experienced in dealing with our particular format.

(iii) We consider it unwise to change radically the well established way in which takers-off set down their dimensions but instead to adapt the machine technique to the taker-off rather than vice versa. Nevertheless the profession must be ready to consider new techniques.

(iv) The financial estimates are given in Appendix IV.

(C) *The Commercial Bureau*

(i) A commercial bureau to serve the profession and advised by experienced quantity surveyors would most likely prepare standard libraries which it would make available to its clients. This would save a firm the very considerable initial costs of preparing, coding and recording its own library, programming the computer and the recurrent costs of keeping the library up to date.

(ii) We cannot, of course, comment upon likely charges as these may well be dictated by commercial considerations.

(D) *The Profession's own bureau*

(i) It may well be that a bureau or bureaux should be set up by the RICS and run on similar lines to a commercial bureau.

(ii) We have not gone into the likely costs or charges in any detail but it would appear that, when experience has been gained by using the manufacturer's bureau for the computer processes and when the total volume of work has grown to the extent envisaged in Appendix II, it may well be worth while to purchase or hire a computer.

The savings in cost compared with the manufacturer's bureau (B) may then be very considerable.

12. The wider implications of Data Processing

(1) The building and civil engineering industries, of which the architectural, engineering and quantity surveying professions form an integral part, are being urged, and are themselves striving, to improve their planning and constructional methods and bring them more into line with progressive techniques in other industries and so reduce costs. Considerable progress has already been made but much yet remains to be done : the adoption by the quantity surveying profession of data processing for working-up might well be the catalyst for speeding up the desired changes.

(2) The adoption of integrated data processing by the building and civil engineering industries would open up exciting possibilities such as :—

(*a*) The recording of costs by contractors as a basis for future estimating. This would be particularly valuable if methods of measurement could be directly linked with methods of cost recording.

(*b*) Using such recorded data, kept up to date by reason of changes in labour rates, prices of materials, etc., and suitably adjusted for the particular job, in conjunction with the quantity surveyors' data which produced the bill of quantities, to price the bill automatically exactly as the individual tenderer would wish.

(*c*) Using the data which produced the bill of quantities to provide data for :—

(1) Planning constructional operations.
(2) Ordering materials.
(3) Forecasting labour requirements.
(4) Bonusing.

(3) We foresee the adoption of integrated data processing techniques speeding construction and lowering costs. As their full use can only be possible given adequate pre-contract planning, it is likely in the future that any jobs not adequately pre-planned will cost considerably more.

(4) The basis for all subsequent data processing operations is the accurate bill of quantities.

13. Recommendations

We therefore recommend that the RICS should :—

(1) Consider the production of a standard coded library and we suggest that three very experienced chartered quantity surveyors be commissioned to prepare it.

(2) Investigate and recommend a data processing system for general adoption ; and

(3) Consider the setting up, operation, financial structure and costs of a service bureau in London and estimate the charges to be made for processing.

14. Conclusion and Acknowledgment

(1) We consider we have now carried out this study to the extent outlined in our brief.

(2) We would like to place on record our grateful appreciation of the assistance given us by the following firms and their representatives :—

Messrs. Elliott Brothers (London) Ltd.
Mr. D. A. Smart, B.Sc.(Econ.)
International Business Machines (United Kingdom) Ltd.
Mr. H. S. Jones
International Computers and Tabulators Ltd.
Mr. M. H. Williams and Mr. G. A. Riocreux

Their help has been invaluable.

APPENDIX I
ILLUSTRATION OF CODING AND LIBRARY ITEMS FOR " A BED OF CONCRETE "

1. Indicator

If the bill is to be in elemental order it is necessary to have a code for this : even in the case of trade bills it would appear nevertheless highly desirable for the purpose of :—

(*a*) Overall feasibility checks.
(*b*) Cost analysis records.
(*c*) Cost planning.

This " indicator " could possibly be represented by a code of one alphabetic character or two numeric digits.

2. Trade and Section of Trade

These could be represented by a mnemonic or partly mnemonic code of 2 alphabetic characters such as :—

CO	Concretor	General concrete work
CR	,,	Reinforced concrete work
CP	,,	Precast concrete
CS	,,	Sundries
CF	,,	Formwork
CX	,,	Reinforcement

A non-mnemonic code would require one alphabetic character and one numeric digit.

3. Main Description

e.g.

Mix of Concrete
Type of Cement—normal, rapid hardening, etc.
Integral waterproofers
Compaction—hand or vibrated
Packing around reinforcement

There are so many combinations of these possible that, for a uniform code to apply to all jobs, at least two numeric digits would be necessary.

As only a limited number are likely in any one job an alternative method would be to give a single digit numeric or alphabetic *ad hoc* code thus :—

A	Unreinforced	hand	compacted	concrete	1 : 8
B	,,	,,	,,	,,	1 : 3 : 6
C	,,	,,	,,	,,	1 : 2 : 4
D	Reinforced	,,	,,	,,	,,
E	,,	vibrated	,,	,,	,,
F	,,	,,	rapid hardening cement concrete 1 : 2 : 4		
G	,,	,,	waterproofed concrete 1 : 2 : 4		

4. Item Type

It will be necessary to indicate whether the item is a cube, super, run or number and whether the detail description number following uses a sequential, fully representative or partly representative code. These could probably be represented by a single alphabetic character.

5. Size

We do not consider that the library need differentiate between items of the same description but of different size as size can be keyed directly as part of the code.

There is, we are informed, no difficulty with fractions of an inch when using paper tape though with systems using punched cards it may be necessary to reduce fractions to decimals, eighths or sixty-fourths. Cases where size is given in other units, e.g. millimetres, gauges, weight per square foot etc., are not expected to create any special difficulty.

For " a bed of concrete " any thickness up to but not including 12 inches in multiples of $\frac{1}{4}$ inch is all that is required but, as other trades would certainly require sizes to the nearest $\frac{1}{8}$ inch and might require them to the nearest $\frac{1}{64}$ inch,

it is considered preferable to have a standard code such as :—

	To nearest ½″			*To nearest 1/64″*		
	Ft.	in.	fraction	Ft.	in.	fraction
3″ might be coded	00	3	0	00	3	00
4½″ might be coded	00	4	2	00	4	16
11 63/64″ might be coded				00	11	63
99′ 6″ might be coded	99	6	0	99	6	00

The latter is favoured as being of wider application.

6. Detail Description

Alternative I (Sequential Code)

The following descriptions are taken from some fifty actual bills of quantities and possibly represent a fair selection of the items which frequently recur.

			Code
Surface bed.			001
Do.		to receive screed or paving.	002
Do.		to receive screed or paving laid whilst green.	003
Do.		to receive membrane.	004
Do.		with spade face.	005
Do.		with screed finish.	006
Do.		floated smooth.	007
Do.		with finish type A.	008
Do.	to falls.		009
Do.	do.	to receive screed or paving.	010
Do.	do.	with screed finish.	011
Do.	do.	with tamped finish.	012
Do.	do.	floated smooth.	013
Do.	to falls & currents.		014
Do.	do.	to receive screed or paving.	015
Do.	do.	with screed finish.	016
Do.	do.	floated smooth.	017
Do.	to slope.		018
Do.	do.	to receive screed or paving.	019
Do.	do.	to receive membrane.	020
Do.	do.	floated smooth.	021
Do. in bays method A.		to receive screed or paving.	022
Do. in bays method B.		to receive screed or paving.	023
Do. do.	to falls.		024
Do. in bays method C.			025
Do. do.		to receive screed or paving.	026
Do. do.		to receive screed or paving laid whilst green.	027
Do. do.		with finish type A.	028
Do. in bays method D.		to receive screed or paving.	029
Do. do.		with tamped finish.	030
Do. do.	to falls.	to receive screed or paving laid whilst green.	031
Do. in bays method E.		to receive screed or paving.	032
Do. do.		with screed finish.	033
Do. do.	to falls & currents.	to receive screed or paving.	034
Surface bed in bays method E.	to falls & currents	to receive screed or paving laid whilst green.	035
Do. in bays method F.		to receive screed or paving.	036
Bed in surface trench.			037
Do.		with spade finish.	038
Do.	to slope		039
Bed in surface pit.			040
Do.		with spade finish.	041
Do.	to slope		042

The above illustration shows simple sequential coding and needs two numeric digits. To make easier the insertion of rogue descriptions the simple sequence could be divided into "blocks" with vacant numeric digits between. To allow for this and to include a reasonable number of other likely descriptions will probably need a three numeric digit code.

Alternative II (fully representative code)

	Code				
Surface bed	0				
Bed at basement level	1				
Bed in surface trench	2				
Bed in surface pit	3				
Bed in basement trench	4				
Bed in basement pit	5				
Paving	6				
Paving to footway	7				
Paving to roadway	8				
(*vacant*)	9				
——(*nothing stated*)		0			
in bays method A		1			
in bays method B		2			
in bays method C		3			
in bays method D		4			
etc.					
(*vacant*)		9			
——(*nothing stated*)			0		
to falls			1		
to falls and currents			2		
to cambers			3		
to cambers and falls			4		
to slope			5		
to slope of ——°			6		
to slope of ——°			7		
(*vacant*)			9		
——(*nothing stated*)				0	
to receive screed or paving				1	
to receive screed or paving laid whilst green				2	
to receive membrane				3	
with spade finish				4	
with screed finish				5	
with tamped finish				6	
floated smooth				7	
with finish type A				8	
with finish type B				9	

Certain systems allow of up to twelve as a "single" digit but this may not always be economic and this illustration of coding employs only ten.

The vacant "9" in the first column is available for coding other items in the same sub-section of concretor. The vacant "9" in the second and third columns is for non-standard or "rogue" items.

Using fully representative coding will probably, as in the above example, need four numeric digits.

7. Example of Coding

A description to appear in the "Concretor" bill in the section of "General Concrete Work" under the heading of "Unreinforced hand compacted concrete 1 : 2 : 4" of :—

"4½" Surface bed to falls and currents to receive screed or paving"

might be coded on the dimension sheet thus using a "sequential" detail description code (Alternative I) :—

(1)	(2)	(3)	(4)	(5)	(6)
B	/ CO /	C	/ D /		/ 015

or using a "fully representative" detail description code (Alternative II) :—

(1)	(2)	(3)	(4)	(5)	(6)
B	/ CO /	C	/ D /		/ 0012

The above parts of the code are as follows :—

(1) Indicator
(2) Trade and section of trade
(3) Main description
(4) Item type
(5) Size (the person doing the coding will not have to insert this, the punch operator will do so).
(6) Detail description.

APPENDIX II

VOLUME OF DATA TO BE PROCESSED

1. The following assumptions have been made for the purpose of the estimates given in Appendix IV. It must be stressed, however, that many of the figures are little more than guesses and cannot be confirmed without a great deal of research and some experience in operation. In particular until a library has been prepared and coded it is difficult to assess the relative number and size of "preambles." The figures we have used assume that most descriptive matter goes into the body of the bill but with data processing there is bound to be a tendency to put more into the preambles and less into the bill descriptions. We do not consider that this is likely materially to affect the estimates we have given.

2. Standard Library

	Number	*Av. length (inches of pica type)*
Preliminaries and preambles (coded sequentially in blocks	2,000	25″
Descriptions (coded sequentially in blocks)	12,000	14″
Descriptions (fully representative coding)—		
Part descriptions each represented by a single significant digit ...	36,000	5″
	50,000	

3. Coding

The likely size of the code is given in Appendix I.

4. Measurements

For the purpose of calculating the time to be taken by punch operators keying the dimensions the average numbers of characters has been taken as follows :—

Cubes	—15 characters	e.g.	2/35·6* 3·3* 4·9*
Supers	—12 characters	e.g.	2/25·1* 13·9*
Runs	— 9 characters	e.g.	2/2/25·9*
Numbers	— 6 characters	e.g.	2/4/3 *

Note :

* denotes a changeover symbol just as the "/" would have to be represented by a symbol. The underlining will not need to be keyed.

5. Size of Jobs

In the sections which follow the term "building" means any building or civil engineering work for which a separate bill of quantities is required. The number of separate buildings in any contract has no bearing on the number of "buildings" when used in the sense employed here.

For example to take the case of a factory project, separate bills of quantities might be required as follows :—

Bill No. 1 Preliminaries and preambles.
„ „ 2 Factory block.
„ „ 3 Office block.
„ „ 4 Canteen and welfare block.
„ „ 5 Gatehouse.
„ „ 6 Cycle stores and other ancillary buildings.
„ „ 7 External works, drainage and external services.

This would be treated for data processing as six "buildings."

For the purpose of the estimates in Appendix IV "buildings" have been classed as "small," "medium" or "large" : this depends not upon cost or physical size but upon complexity. It may well be there are buildings simpler than the "small" and where data processing might show no financial saving as compared with manual methods of working-up. It is unlikely however that there can be many "buildings" more complex than the "large" of our illustration.

The estimates have been based upon the following volumes of data for bills of quantities prepared in accordance with the Standard Method of Measurement of Building Works, *viz* :—

	Small	*Medium*	*Large*
In the taking-off:—			
Cube dimensions ...	75	125	500
Superficial dimensions...	800	1,000	6,000
Lineal dimensions ...	1,000	1,200	7,000
Enumerated items, P.C. sums, etc.	375	525	1,500
Descriptions against the foregoing	1,800	2,150	9,000
Producing a typescript bill (right hand billing) in pica type of the following number of foolscap pages :—			
Preliminaries and preambles	32	36	40
Bill proper	90	120	300
	122	156	340

	Small	*Medium*	*Large*
Or in terms of lines of type :—			
Preliminaries and preambles (average 5·5 lines per item) ...	1,496	1,683	1,870
Bill proper (average 3·2 lines per item) ...	3,744	4,992	12,480
	5,240	6,675	14,350
corresponding roughly with " buildings " which might cost :—	Up to £50,000	£100,000	£1,000,000

6. For a preliminary consideration of the likely cost of data processing by a single service bureau to handle suitable work of private quantity surveyors in London and the home counties we have assumed 1,000 small, 250 medium and 50 large buildings per annum with a total value of some £60 million.

APPENDIX III

DESCRIPTIONS OF THE SYSTEMS proposed by :—

(A) Elliott Brothers (London) Limited (a member of the Elliott Automation Group, associated with the National Cash Register Co. Ltd.)

(B) International Business Machines (United Kingdom) Ltd.

(C) International Computers and Tabulators Ltd. (Hollerith and Powers-Samas Equipment).

All three firms have examined the possibility of using punched cards for the storage of the library data and electro-mechanical sorting and collating of the input and library data. Whilst such a system might find a place for specialised types of work (see section 6 of our Interim Report) the impression we have gained is that for general application it would be cumbersome and uneconomic and would not open up the much wider future possibilities in the application of data processing. Quite independently the three firms have come to the conclusion that computers would better suit the needs of the quantity surveying profession and the building and civil engineering industries.

In the sections which follow are summaries of the reports and recommendations of the above firms. The systems proposed have many points in common and the summaries of the IBM and ICT systems illustrate the particular differences in equipment and procedure.

(A) ELLIOTT BROTHERS (LONDON) LTD.

1. Alternative types of computer are proposed namely the :—

Elliott 803 Type B 4303 (available now) ; or
Elliott 503 using
(i) magnetic film (available late 1962) ; or
(ii) magnetic tape (available 1963).

2. Computer

The 803 will produce two bills of quantities for " small " or " medium " sized " buildings " per day, whilst the larger 503 with magnetic film and line printer would produce about four and with magnetic tape and line printer about ten per day. More per day could be produced by shift working.

2.1 Elliott 803 Type B 4303

Using an 803 computer the recommended system includes :

(*a*) a basic computer with an 4,096 word core store ; each " word " or register can hold the equivalent of 11½ decimal or 6 alpha-numeric characters.

(*b*) a binary keyboard.

(*c*) a papertape station Type 2 with two input readers and two output punches.

(*d*) a magnetic film controller with three handlers.

The computer employs transistors and the main cabinet is only 5′ 6″ × 1′ 4″ × 4′ 8″ high.

The system can be installed in a normal type of office and no special floor strengthening or air conditioning is necessary.

The use of two papertape punches enables two tapes to be produced at the same time. One of these includes details which are required to be shown in the bill of quantities itself, and the other gives detailed information on the individual dimensions and items which constitute the total for each description in the bill proper.

Three film handlers allow an easy approach to sorting within the computer and provide a flexible approach to data processing problems generally.

2.2 Elliott 503

The basic specification of this larger machine includes :

(*a*) the processing unit including a fixed and floating point arithmetic unit and an 8,192 words core store.

(*b*) two papertape readers and two punches.

(*c*) a directly connected Flexowriter for addressing the computer and for use as a direct output medium.

(*d*) a binary keyboard.

In addition to these features, a 600 line per minute printer and a peripheral transfers control unit are recommended, and also, either :

(i) a magnetic film controller with three film handlers ; or

(ii) a magnetic tape controller with three tape decks.

3. Ancillary Equipment

3.1 *Tape Preparation Equipment*

This includes :

(*a*) Papertape keyboard punches

(*b*) Papertape verifiers

(*c*) Papertape controlled keyboard page-printing perforators.

The keyboard punches are required for punching dimensions from the taking-off sheets on to papertape. The verifiers are used to check the accuracy of this initial punching prior to feeding this papertape to the computer.

The page-printing perforators are required for sundry tape editing purposes.

3.2 *Printing Equipment*

No " on-line " printer is attached to the 803 computer. Results are produced on papertape and subsequently fed to automatic electric typewriters away from the computer. Friden Flexowriters are recommended and one machine would take about 8 to 11 hours to print a " small " or " medium " sized bill of quantities. This means that with three Flexowriters the printing of results keeps up with the output of tape from the computer.

Using the alternative 503 systems the bulk of the output is printed " on-line " by the line printer, and Flexowriters are required to produce details of individual dimension items only. One typewriter takes about 1¼ to 2 hours per bill on this work.

4. Outline of the Computer Method

4.01. The " library " is preserved in the form of codes and descriptions (excluding size) on magnetic film or tape in the same order as they will appear in the bill.

4.02. The measurements from the dimension sheets together with the codes, including where necessary the size portion of the description, are punched onto the input papertape and verified.

4.03. The computer is set up for handling quantity surveying working-up by feeding in papertape containing the " programme." It will then continue to operate until required for some other purpose after which it can again be reprogrammed similarly. This operation takes very little time.

4.04. The input papertape is then fed into the computer, the " squaring " of dimensions takes place and the items are written away on to magnetic film or tape in the same order as the original taking-off.

4.05. It is now necessary to sort these items into the library reference code number order in the computer.

4.06. The " Library Film " (or tape) is placed on a film (or tape) handler and that containing the sorted dimension items on another. Both are in the same order and each is read by the computer in conjunction with the other.

4.07. A papertape is then produced giving the basic details for each set of dimensions ; that is, the code reference, the extended dimensions, and the number of the page on which this item was originally found on the taking-off sheets. This information is required for any manual reference which may be necessary later (e.g. at the variation account stage if this is not to be handled by data processing).

4.08. At the same time the measurements for each reference code are summed and divided by the relevant conversion factor (e.g. from feet to yards) which is found on the " Library Film " (tape).

4.09. All details are now available to produce the bill of quantities itself. The page and column layout can be arranged exactly as is at present customary. The underlining of words is not however provided.

4.10. In those sections of the " Library " where fully or mainly representative coding is employed, headings and " dittoes " will be printed out on the bill where appropriate.

4.11. In those cases where the required descriptions are non-standard and are not found in the " Library " (i.e. " rogue " items), the reference code is printed out together with the relevant taking-off sheet number, and sufficient space is left on the print-out to enable a description to be entered by hand afterwards.

4.12. Using the 803 computer, papertape is produced for subsequent printing on Flexowriters whilst the 503's output is direct on to the line printer. Some saving in time could be achieved by using wider paper than foolscap and a longer line of print ; that is, fewer line feeds would be needed to be punched out on the 803 and better advantage would be taken of the 120-character wide 503-line printer. With the 803 the saving is only marginal, but in the latter case a saving of 40 per cent in the output time is anticipated.

5. Timings of Operations

5.1. *Paper tape punching from taking-off sheets*

Estimated times for punch and verifier operators, based upon 8,000 key depressions per hour :—

	Characters	*Operator Hours*
" Small " building	80,000	10×2=20
" Medium " „	102,000	13×2=26
" Large " „	527,000	66×2=132

5.2. 803 *Computer Timings*

Using the 803 Computer the estimated timings of operations in hours are :—

	" *Small* " *building*	" *Medium* " *building*	" *Large* " *building*
Input (at 100 characters per second)	0·25	0·5	1·5
Sorting and film merging	0·5	0·75	6·25
	0·5	1·5	7·5
Output (at 70 characters per second)	1·5	1·75	4·25
Read Library Films	1·0	1·0	1·0
Total	3·25	4·0	13·0

5.3. 503 *Computer Timing*

Below are comparable figures for the 503 using magnetic film ; magnetic tape estimates are given in brackets.

	" *Small* " *building*	" *Medium* " *building*	" *Large* " *building*
Input (at 500 characters per second)	0·05(0·05)	0·1 (0·1)	0·3 (0·3)
Sorting and film (tape) merging	0·25(0·05)	0·25(0·05)	4·0 (0·5)
Output (mostly at 500 lines per minute)	0·3 (0·3)	0·5 (0·5)	1·5 (1·5)
Read Library film (tape)	1·0 (0·1)	1·0 (0·1)	1·0 (0·1)
	1·6 (0·5)	1·85(0·75)	6·8 (2·4)

5.4. *Printing Timing*

If the 503 is used the bulk of the printing is directly on to the line printer and is included in the above computer timing whereas with the 803 the employment of off-line Flexowriters is recommended.

Estimated timings are :

For " small " buildings	8– 9 Flexowriter hours
For " medium " buildings	10–11 Flexowriter hours
For " large " buildings	28–29 Flexowriter hours

(B) IBM (UNITED KINGDOM) LTD.

1. Equipment

The proposals envisage the use of the following equipment:

Input Equipment

IBM 024 Alpha key card punches
„ 056 Verifiers
„ 082 Sorter

Computer, ancillary and output equipment

IBM 1402 Read/Punch Unit Mod. 1
„ 1401 Computer—Processing Unit Mod. C.4.
„ 1406 Additional Core Storage
Multiply/Divide Feature
Advanced Programming Feature
„ 729 Mod. 2 Tape Units (2 necessary)
„ 1403 Printer (100 print positions) Mod. 2

2. Outline of Computer Method

2.1. The " library " is preserved in the form of codes and descriptions (excluding size) on magnetic tape in the same order as will appear in the bill.

2.2. The measurements from the dimension sheets together with the codes and sizes are punched on to calculation cards (standard 80 column cards) and verified.

2.3. " Rogue " descriptions suitably coded will be punched

on to cards and verified at the same time as the calculation cards.

2.4. The calculation cards and rogue description cards are sorted electro-mechanically into code sequence and fed into the computer via the Read/Punch unit.

2.5. The " squaring " calculations, casting and reducing to the appropriate unit for billing are carried out in the computer and the results (which will be in code sequence) stored.

2.6. The library magnetic tape will then be compared in the computer with the stored input data and the result, including rogue descriptions, printed out as a draft bill. Double spacing is recommended to facilitate manual editing.

2.7. If a separate list showing " squarings " is required for attachment to the dimension sheets this can be prepared by resorting the calculation cards back into dimension sheet sequence, reading them into the computer and printing out the results. The cost of doing this was not included in their estimate.

2.8. Dimension sheet numbers can be printed out against each item of the bill without extra time or cost being involved.

3. Timing of operations

3.1. *Card punching from taking-off sheets*

Estimated times for punch and verifier operators based upon 8000 key depressions per hour :—

	Cards	× 76 = *Columns*	*Operator Hours*
" Small " building	2,250	171,000	$21\frac{1}{2} \times 2 = 43$
" Medium " ,,	2,850	216,600	$27 \times 2 = 54$
" Large " ,,	15,000	1,140,000	$142 \times 2 = 284$

3.2. *Sorting*

To sort the above number of cards on 24 columns for code —this includes the size—the times are estimated as :—

" Small " building	1 hour 50 minutes
" Medium " ,,	2 hours 20 minutes
" Large " ,,	12 hours

3.3. *Computer*

Approximate times are given as follows :—

" Small " building	$\frac{3}{4}$ hour
" Medium " ,,	$\frac{3}{4}$ hour
" Large " ,,	$1\frac{1}{4}$ hours

IBM 1402 Read/Punch unit can read cards into the computer at up to 800 cards per minute. IBM 1403 Printer can print at up to 600 lines per minute. These times are included in the above computer times.

To list the dimensions will take an extra 10 minutes for " small " and " medium " buildings.

(c) ICT (INTERNATIONAL COMPUTERS & TABULATORS LTD.)

1. In their report ICT make two important reservations regarding the procedure recommended by the Working Party, *viz* :—

(i) In connection with non-standard or " rogue " descriptions they assume that for the average job to be data processed the proportion of standard library descriptions and " rogues " would be in the order of 95 per cent and 5 per cent respectively and that on this basis they would give their full support to a fully integrated scheme.

They go on to say that " But if the above proportions are very inaccurate, an alternative scheme or two separate schemes could prove more expedient. In other words, it may be advisable to draw a line short of the ideal and to consider the best method of co-ordinating the computer and other allied functions. We are confident, in fact, that a very efficient scheme can be devised in which the comparative loss of time would be of small consequence and in which real computer time could be used at a higher productive rate."

(ii) In connection with coding they state that " there has been much thought and discussion about coding and this must continue. It would be highly inaccurate to suggest that the subject has yet been sufficiently probed or understood, nor can we say, with confidence, that we are approaching a compact and workable pattern. But this is the core of the entire project. In using the expression " a—workable pattern ", we have in mind particularly the creation of input. Once data has been read into a computer the human factor can be ignored ; it is then a question of the speed and power of the machine. Before the original dimension items can be read in, however, the following manual processes must be undertaken :—

(i) The precise item must be located in the appropriate section of the library of standard descriptions.

(ii) The corresponding code number must then be read and, with complete accuracy, entered against the item on the dimension sheet.

The significant point we wish to highlight is that two vital and extremely onerous clerical functions are involved. Locating an item in the library should be comparatively simple because it will be suitably sectionalised. However, it will be a routine task of some monotony, the degree of which will vary according to the volume of work on hand. But the greatest danger we see is the actual entering of a complicated code number, indicating the need for some rigid check system. The code system to be adopted is necessarily complicated as a number of separate but related roots must be combined. This makes a comprehensive check digit system impossible and anything less would be inadequate. We understand, however, you are satisfied that the combination of checks that will exist will suffice. These will include :—

(1) A clerical " ticking " check of the codes entered by the Taker-off on to the dimension sheets.

(2) By-and-large " group " checks.

(3) Normal editing of the Bill.

2. Equipment

Input Equipment

Automatic card punches, Verifiers, Sorter } Standard 80 column punched card equipment

Computer, ancillary and output equipment

Type 1301 computer using magnetic tape with ancillary and output equipment.

3. Outline of Computer Method

3.1. Assuming that :—

(1) The dimension sheets have been fully coded and checked together with any special instructions and a note of the number of items measured.

(2) The computer has been programmed.

the processes are :—

(*a*) Note in control book total number of items measured.

(*b*) Punch and verify cards.

(*c*) List off and count cards. Agree with control.

(*d*) Sort cards to " library " code sequence.

(*e*) Process cards through computer against "library" record held on magnetic tape, extracting descriptions required, simultaneously carrying out necessary calculations, summarising like results and writing these, together with selected descriptions, on to the contract tape.

(*f*) From the contract tape print the draft bill of quantities.

3.2. The system proposed covers :—

(i) The automatic insertion of trade headings in the printed draft bill.

(ii) The automatic insertion of sub-headings and dittoes in the printed draft bill where a representative coding is employed for the "library" or the computer can be appropriately programmed.

(iii) Handling non-standard or "rogue" descriptions in either of two ways, *viz* :—

(*a*) Punching the items in full (assuming they have been written on the dimension sheets in unabbreviated form and in the same form of wording as is used for standard library items).

(*b*) Leaving a blank in the printed draft bill but with the dimension sheet reference to facilitate the manual insertion of the description.

4. Timing of Operations

	"*Small*" *building*	"*Medium*" *building*	"*Large*" *building*
Preparation of punched cards from dimension sheets : (Based upon 10,000 key depressions per hour) *Note :* This is a higher speed than assumed by IBM			
Punch and verifying operator hours	14	17¾	86
Sorting punched cards (Based upon effective sorting speed of 35,000 card passages per hour)			
Machine hours	1½	2	10
Computer processing			
Minutes	15	20	65
Contingencies, allow minutes	5	5	25
Printing			
Minutes	20	30	60

APPENDIX IV
ESTIMATES OF COST

1. Estimates were obtained from the three firms, who collaborated with us, of the charges to be made for data processing by their own service bureaux the working-up of quantity surveyors dimensions up to the stage of a typescript draft bill ready for editing, including preliminaries and preambles but excluding the coding of dimensions and checking of "waste" calculations. The figures are based upon the assumed volumes of data given in Appendix II.

2. The total costs fall under four main heads, *viz* :—

(A) Preparation of typescript standard coded library(ies) and printing.

(B) "Programming" the computer, test running, and punching and recording of the library(ies).

(C) Periodical revision of the library(ies).

(D) Data processing of the actual dimensions.

[A] Preparation of typescript standard library

1. This is a major operation for which we recommend that three experienced chartered quantity surveyors should be commissioned. The writing of such a library cannot be divorced from the coding of it and this is linked with the capabilities and economics of the particular data processing system and equipment chosen. It is recommended to us that the quantity surveyors preparing the typescript library first attend a course on programming and coding so as to be conversant with the machine's requirements.

2. The manufacturer will be required to collaborate and firms will charge upon an hourly basis.

3. It is not practicable at this stage to estimate what the total cost will be of preparing the first typescript coded library based upon the Standard Method of Measurement but it is thought that it will run into five figures.

4. Every taker-off must have access to a printed version(s) of the library(ies) and may possibly have his own copy(ies) but printing costs could be covered by the charges to be made.

[B] Programming the computer, test running, and punching and recording of the library[ies] on to magnetic film or tape

1. The charge by the manufacturer for the above on the basis of a single library of the size assumed in Appendix II varies considerably depending upon the type of equipment and the refinements to be incorporated in the system. The use of punched papertape for input shows figures towards the lower end of the range with punched cards towards the upper end.

2. The manufacturer will require quantity surveyors to collaborate in this initial setting up : it would be an advantage if they were the same persons who prepare the library.

3. The initial cost of programming for and recording this first basic library, based upon the Standard Method of Measurement, can therefore be expected to be in the range of £5,000 to £15,000.

4. The costs of subsequently programming for and recording other libraries, based on other methods of measurement, would, we expect, be considerably less as much of the programming would already have been done.

[C] Periodical revision of the library[ies]

1. (A) and (B) are initial costs which need not be incurred again until some radical changes in methods of measurement or format of the bill or a change in the type of computer is desired.

2. There will however, be periodical revisions to be made to the typescript and film or tape libraries by reason of new building materials and techniques and perhaps of minor changes in methods of measurement. Assuming 1 per cent of the library will need repunching on each occasion but no reprogramming the manufacturer's costs are likely to range from £40 to £130 a time.

[D] Data Processing by a manufacturer's service bureau

1. The estimated costs given us are in the order of :—

	Per "building" in the category : "*Small*"	"*Medium*"	"*Large*"
(i) Input on punched papertape	£75–£115	£95–£130	£325–£460
(ii) Input on punched cards	£75–£100	£95–£115	£315–£455

2. A comparison between (i) and (ii) shows a remarkable similarity in the figures at the ends of each range. This leads us to the broad assumption that, other than for initial costs (A) and (B), there is likely to be little to choose as regards cost between papertape input, which requires sorting into bill order in the computer, and punched card input, which can be sorted mechanically. Furthermore the position in the range of costs in each bracket appears to depend mainly on the capacity of the computer : in general the larger and more expensive the computer and the use of magnetic tape rather than film the much greater the speed and thus a saving in cost per " building " to be processed.

3. Charges by a manufacturer's bureau may well be lowered when the volume of work increases to an extent that occupies a computer almost exclusively for quantity surveying work.

Computers and their Application to the Production of Bills of Quantities

By Mr. D. A. Smart, BSc(Econ)

The following paper was presented at a quantity surveyors' general meeting held on 18 *October* 1961.

Introduction

As far as the general public is concerned, computers and their uses are still shrouded in a world of mystery. This is most unfortunate and completely unnecessary.

To understand how a computer works naturally requires an electronic engineering background, but the uses and potential uses of a computer can be understood by anyone with a little common sense.

A computer can be looked upon as a very large accounting machine, with a large number of registers (called " words ") which can be used to accumulate numbers or to store instructions or other alpha-numeric information. In addition to these storage facilities it contains an arithmetic unit which is capable of addition, subtraction, multiplication and division. The computer can also be instructed to take logical decisions. For instance it can be asked to look at a number in one of its registers and if that number is negative to do one thing, and if the number is positive, it can be made to do something else.

These instructions can be written in two ways—either in machine code language, or in autocode language. In the former case certain numbers and symbols are punched on to paper tape and fed to the computer. These numbers define which function has to be obeyed by the machine.

For example : 30 101 : 04 102
20 103 :

This set of orders means pick up the contents of register (word) number 101, add the contents of 102 to this and store the addition in register (word) number 103.

In the case of autocode language the instructions are written in pseudo mathematical terms.

For example : READ A
READ B
C = A + B
PRINT C

This means read a number from the paper tape reader into the computer, allocate a register and call it " A," do the same with " B," add " A " and " B " together and store it in a register called " C " and print this answer.

Obviously this latter method of programming in autocode is easier and quicker than the machine code method. It is, in fact, very speedily learnt.

However, using either method the instructions are transferred on to punched paper tape, read into the computer and preserved in the computer store. Subsequently these store locations are set one at a time into the order register of the machine, and it is from this position that the instructions are actually obeyed.

Brief Description of the Problem and the Proposed Method

The computer is required to produce bills of quantities using the dimensions from the taking-off sheets, and a library list of the standard descriptions and preambles.

The computer method involves firstly building up the standard library, these details are punched on to paper tape and written on to a magnetic tape—which constitutes a part of the computer store. It is estimated that one 3,600-foot reel of tape would hold the complete library—*i.e.*, allowing for 50,000 preambles, preliminaries and descriptions. The computer could read this completely in under 5 minutes!

Once the standard library is constructed, the next stage is to punch dimensions details from the taking-off sheets, plus a reference code number to the relevant library description. These dimension items are read and rearranged within the computer into a list in the order of the reference code numbers, so that they are in the same sequence as the library record itself.

It only remains to compare this list with the library and to print out the dimensions, extended where necessary, together with the appropriate description. The printing is by means of a 600 lines per minute printer and the format is very similar to the present one.

The Equipment

The basic input to the computer is 8-channel punched paper tape. Against each position on the tape a combination of up to 8 holes is punched. Each of these combinations represents a number, letter, punctuation mark or other symbol.

This tape is prepared using a tape punch with a very similar keyboard to an ordinary typewriter and it is checked for accuracy by a second operator using a verifier machine. A copy of the original tape is made at the same time and as

errors are located they are automatically corrected by the verifier operator.

The computer recommended to handle the production of bills of quantities for firms in the London area is the Elliott 503. This system would be capable of producing over 1,300 bills in a year.

It consists of two paper tape readers for basic input purposes and two paper tape punches which produce tape for subsequent sundry printing. The central store of the machine consists of 8,192 registers (or words) of core storage. The access time to any one of these locations is 3½ micro-seconds! About 62,000 additions or subtractions can be performed in a second and nearly 20,000 multiplications per second! In addition to the core store three magnetic tape decks are to be used. These hold the magnetic tape which, for example, contains all the details of the standard library. These data are read section by section from the tape into the core store where any processing actually takes place. A 600-lines-a-minute printer is provided to produce the printed bills. This prints one line at a time in a manner somewhat like an ordinary punched card tabulator. 120 character positions are available on each line and each position has a repertoire of 56 characters.

The Standard Library

The main problem encountered in considering this computer application is the difficulty of defining the master file of preambles, preliminaries and descriptions which are required for the bills. It is estimated that there are 50,000 such items which are in general use and which will cover perhaps 90 per cent of the requirements for a particular bill.

Each item requires a unique reference code to define that particular description.

This code consists of :—

(*a*) the indicator (specifying the part of the building for cost analysis purposes, *e.g.*, sub-structures and external structures)
(*b*) the trade
(*c*) the section of the trade
(*d*) the descriptive heading within the trade section
(*e*) the item type (specifying whether the item is a cube, super, run or number and whether the description number following uses a sequential, fully representative or partly representative code) and
(*f*) the description number.

(*a*) to (*e*) can all be represented by one alphabetical character ; (*f*) requires four numeric digits.

When punched on to paper tape, these codes will be in the form :

ls A B C D E fs 1 2 3 4 (ls = letter shift symbol ; fs = figure shift symbol).

The four-digit description number is one of three types : either

a fully representative code, or
a partly representative code, or
a sequential code.

In the first case (*e.g.*, 1/2/3/4) each individual of the four defines one phrase of alphabetic description so that the four digits together provide a full description.

In the second case (*e.g.*, 12/34) the first two digits specify a part description which is common to several items. The final two digits are serially numbered within the first two.

In the case of a sequential code (*e.g.*, 1234) the descriptions are serially numbered using all four digits and is of most value where part descriptions for items are non-repetitive and nothing can be gained by a representative coding technique.

The codes described previously define and locate the item (or preamble) description in the Standard Library, but to preserve all possible sizes for any description would not be easy since the various combinations are obviously very large. Instead, the size part of the description is fed into the computer with the actual dimensions, and is only temporarily stored in the system until the appropriate description is found and then the two together are printed out on the bill of quantity.

Sizes are coded very simply, that is, in exactly the same way as they are required to be produced on the final bill. They are either in the form XX sp X sp XX * if no fractions are involved, or XX sp X sp XX—XX/XX * if a fractional length is involved ; *e.g.*, yards, feet, inches and fractions of an inch.

The standard descriptions are stored within the computer in alpha/numeric order according to their reference codes. The building up of tape records involves punching on to paper tape the code letters and numbers followed by the appropriate description and a conversion factor, if applicable. This conversion factor indicates what constant number is to be used to divide into quantities which are subsequently extracted from the taking-off sheets (*e.g.*, to reduce square feet to yards superficial). These paper tapes are read into the computer and written in the same form as they are required to be printed on the bill.

From time to time, additions, amendments and deletions have to be made to these records.

The method employed is to read the original tape records into the core store of the computer. At the same time the amendments, which are punched on to paper tape in code number order are read into the system and the necessary alterations made to the core store. The amended details are then copied on to a second magnetic tape.

The Computer Method

The taking-off procedure from drawings remains the same as at present except that two extra columns are necessary on the dimensions sheets for the insertion of the reference code and of the size description. These have to be written in against the measurements.

A page on the dimensions sheet might look as follows:—

Reference No.	*Size Code*	*Dimensions*	*Abbreviated Description*
ABCDE 1634	2/3/2/	7.0	Formwork to vertical
		8.6	face of conc. wall
	2/3/2/	9.8	
		5.6	
ABCDE 1456	2	/232.2	Formwork to vertical
		5.0	face of retaining wall
	2 /	18.8	
		5.6	
	2 /	7.1	Ddt last
		4.10$	

The " $ " symbol indicates that this set of dimensions is to be deducted for this reference number.

If a description is required which is not included in the standard library and in consequence no reference code is in

existence a dummy code is allocated (*e.g.*, in the form AACED 9999).

The letters prefixing the numbers will define the appropriate trade/sub-trade heading but the individual item cannot be found. These non-standard items are referred to as " rogues."

The reference code, size, dimensions together with a reference to the relevant page on the taking-off sheets and an indication as to whether the item is to be deducted or not is next punched on to paper tape and verified. These operations can either be performed at the office from which the work originates or on the other hand at a central service bureau. The first suggestion has the advantage that any queries arising could be readily cleared.

The paper tape thus produced is sent to the computer and written on to a magnetic tape. The items are still in the same order as they were on the taking-off sheets and have now to be re-arranged into ascending order according to the reference code number. The computer is capable of sorting items very rapidly and several standard programmes are available to do this. The size of the reference code is immaterial in this respect and the time taken is the same whether the sorting key (*i.e.*, the reference code number in this case) is a one digit number or a nine digit reference.

Once this rearrangement is complete a magnetic tape is written containing all dimensions items in order by the library reference code. The Standard Library tape containing all the descriptions, etc., is placed on the computer and read in conjunction with this dimensions tape. Both these tapes are, of course, in the same sequence and as the appropriate description for a reference code on the dimensions tape is located in the library so the description is printed out on the line printer. Simultaneously all dimensions for that particular code are accumulated and conversion factors are applied and the result is printed out to the right of the description in a manner very similar to the present procedure.

If necessary, details for each item including reference to the relevant taking-off sheet can be punched out on to paper tape at the same time and this by-product of the main job can be subsequently printed on automatic electric-typewriters. These typewriters have a paper tape reading mechanism which automatically operates the printing device.

In those sections of the Library where fully or partly-representative coding is employed, " dittoes " will be printed out on the bill where appropriate. For example, if under the same trade, sub-trade heading the descriptions required are for fully-representative codes :

1 2 3 4
1 2 3 7
1 2 4 7
1 2 4 8

the printing will appear thus (" full " means a full description is provided) :

Full (1) Full (2) Full (3) Full (4)
Do Do Do Full (7)
Do Do Full (4) Do
Do Do Do Full (8)

Where the required descriptions are non-standard and are not found in the Library (*i.e.*, " rogue " items), the reference code is printed out together with the relevant taking-off sheet number, and sufficient space is left on the print-out to enable a description to be entered by hand afterwards.

Costs

The costs of these operations vary according to two things. These are firstly the number of dimensions—cubes, runs, squares—recorded on the taking-off sheets and secondly the number of entries on the bill of quantity.

A small sized bill with say an average of 2,250 dimension items and 1,170 descriptions on the bill would cost about £115 at the present time using the 803 Computers in the Elliott Service Bureau, although this figure would reduce to £75 when a 503 Computer becomes available. The corresponding figures for large sized bills with say 15,000 dimensions and 3,900 entries on the bill are £460 using the 803 and £325 using the 503.

If the Royal Institution of Chartered Surveyors rented a 503 Computer of its own, the cost of producing a small sized bill of quantity could be as low as £20 and a large sized bill would cost less than £100.

PRIVATE HOUSE BUILDING IN 1961 AND 1962

The Ministry of Works has recently carried out the third enquiry into private house building. The result of the enquiry shows that private firms engaged on building houses for sale on their own initiative started work on 59,000 houses during the first half of this year, and expect to start 60,000 houses during the second half of the year, making a total of 119,000 houses for the year as a whole.

In the previous enquiry held in November last year contractors expected to start 131,000 houses during 1961 : the main reasons for the shortfall this year were stated to be delays in planning consents, shortages of land, and purchasers' difficulties in obtaining mortgages. Contractors were asked if they could estimate how many houses they would start in 1962. The great majority of firms replied to this question and it appeared at the time of the enquiry that builders expected that there would be little change in their programmes next year. Since then the Chancellor's economic measures have been announced, and these may affect future programmes.

CONSTRUCTION IN GREAT BRITAIN

Contractors in Great Britain carried out constructional work to the value of £600 million in the second quarter of 1961, according to provisional figures collected by the Ministry of Works. The index of production, which rose by 4 per cent compared with the first quarter, was the highest recorded, and was 8 per cent higher than a year ago.

There was an increase in all types of new work compared with a year ago, after allowing for price increases. Work on industrial building was 19 per cent higher, private miscellaneous building rose by 10 per cent and work for public authorities, excluding housing, by 14 per cent.

New housing work rose by 6 per cent compared with last year, with a small increase in work on houses for public authorities and an increase of 9 per cent in housing for private developers.

The provisional figure for the number of operatives employed by contractors in the construction industries in July this year was 1,105,000. This was 15,000 less than in June but 19,000 more than in July last year. The decrease compared with June is probably accounted for by men changing jobs during the holiday period.

Cost Research Panel

Indices of Building Costs by Trades: Two-Storey and Multi-Storey Housing

The rise in the Panel's housing cost indices continued during the second quarter of this year, with the slight rise in labour costs and price increases on cement, sand, steel, non-ferrous metals and paint.

The indices do not measure changes in either market conditions or in increases pending or forecast during construction.

Two-Storey Housing (1954=100)

Year	Quarter	Substructure	Concretor	Bricklayer	Pavior & Roofer	Carpenter & Joiner	Steel & Ironworker	Plasterer	Plumber	Gas Fitter & Electrician	Lift Installation	Glazier & Painter	Total
1956	1	108	107	105	107	106	114	106	115	106	—	102	107·5
	2	110	109	107	108	108	115	109	114	107	—	107	109·0
	3	111	109	108	108	109	115	109	116	107	—	106	109·7
	4	111	109	107	110	109	116	108	115	107	—	107	109·6
1957	1	112	112	109	110	109	116	109	116	109	—	108	110·8
	2	112	113	109	111	110	117	109	117	109	—	108	111·0
	3	115	114	111	113	111	119	111	115	111	—	110	112·6
	4	114	114	111	113	110	121	111	116	115	—	111	111·9
1958	1	114	114	112	116	109	122	113	113	111	—	114	112·4
	2	114	114	113	116	108	122	114	113	107	—	114	112·4
	3	114	114	112	116	107	122	114	113	107	—	114	112·0
	4	114	114	112	116	106	123	113	114	108	—	114	111·7
1959	1	113	111	113	116	105	124	113	114	109	—	115	111·6
	2	113	111	113	117	106	124	113	114	108	—	115	111·5
	3	113	112	113	116	105	124	113	113	107	—	114	111·1
	4	111	110	111	114	104	123	111	113	106	—	113	110·2
1960	1	111	110	111	114	105	123	110	114	105	—	111	110·3
	2	113	110	112	115	108	123	112	116	106	—	113	112·1
	3	113	110	113	117	110	124	112	115	107	—	113	113·3
	4	113	110	115	118	111	124	112	114	108	—	113	114·0
1961	1	115	112	117	123	111	125	113	115	112	—	114	115·7
	2	116	112	117	123	112	126	113	116	113	—	114	116·4

Multi-Storey Housing (1954=100)

Year	Quarter	Substructure	Concretor	Bricklayer	Pavior & Roofer	Carpenter & Joiner	Steel & Ironworker	Plasterer	Plumbing & Heating	Gas Fitter & Electrician	Lift Installation	Glazier & Painter	Total
1956	1	105	105	105	105	106	107	105	121	110	117	105	107·9
	2	107	108	107	109	108	111	107	118	110	118	108	109·9
	3	108	109	110	108	108	114	107	116	110	118	109	110·0
	4	108	109	108	109	108	114	107	115	110	120	108	109·9
1957	1	110	109	109	109	109	121	108	115	111	119	110	110·6
	2	110	111	110	111	110	122	109	115	113	120	111	111·2
	3	111	113	110	111	110	126	110	113	115	122	111	112·9
	4	113	115	110	111	110	127	110	110	113	122	113	114·2
1958	1	116	116	112	112	109	124	114	112	109	121	117	114·4
	2	117	116	112	113	108	124	114	111	103	120	117	114·2
	3	116	116	111	112	107	124	114	112	104	121	117	114·1
	4	116	115	112	111	105	124	114	113	104	122	116	113·9
1959	1	116	115	112	111	105	124	114	115	105	122	117	114·2
	2	116	115	112	111	105	124	114	114	105	122	118	113·4
	3	113	115	112	111	104	123	113	113	103	122	118	112·2
	4	113	113	111	110	104	123	111	113	101	122	116	111·1
1960	1	113	112	111	109	105	122	110	115	99	123	115	111·0
	2	114	113	112	110	107	122	112	116	100	124	117	112·1
	3	114	113	113	112	109	122	112	116	101	124	117	113·0
	4	114	113	115	111	109	121	112	114	102	124	117	112·8
1961	1	115	114	117	112	110	122	113	115	109	124	118	114·2
	2	116	114	117	112	110	122	113	116	110	124	118	114·7

Volume of Work in Hand by Private Chartered Quantity Surveyors

In May 1961, the RICS carried out the third enquiry into the volume of work in hand by private chartered quantity surveyors. The results of previous enquiries covering the six-monthly periods ending 31 March 1960 and 31 October 1960 were presented at the meetings of the National Consultative Council in July 1960 and January 1961. The third enquiry covered the six months ending 31 March 1961, and the results are set out below.

Firms were again asked to state the value of projects for which they had been commissioned (i) to prepare preliminary estimates (Future Projects) and (ii) to prepare tender documents (New Projects).

Great Britain

Enquiry forms were sent to 698 firms of which only 300 (43 per cent) replied. This compares with a 54 per cent response to the first enquiry and 48 per cent to the second and was a disappointing response. Although it follows that any conclusions drawn from the enquiry must be very tentative, allowance has been made as far as possible for missing returns and the figures are therefore comparable.

The value of New Projects dealt with in the 6 months ending in March this year is substantially higher than in the previous two enquiries. This might have been expected in view of the large increase in the figures last September under the heading of Future Projects. The main increase was in the figure for " Other building for public authorities."

The value of work for which preliminary estimates had been prepared (i.e. Future Projects) is a little lower than in the previous enquiry. The main decreases were in the figures for private offices and educational building, but it would not be wise to read too much into these changes in view of the rather poor response. Moreover it may well be that the fall only reflects the inability of the offices or architects to undertake any more work.

Scotland

Enquiry forms were sent to 87 firms of which 35 (40 per cent) replied, compared with 43 (48 per cent) in the last enquiry. This was also a rather disappointing response. Figures for the six months ending 31 March 1961 are given in Table II.

The value of commissions for which preliminary estimates have been prepared shows a substantial increase and suggests that more work will be available in Scotland in the future.

Overseas Commissions

The value of commissions for work overseas secured by the respondents to the present enquiry was £3.0m. for Future Projects and £11.8m. for New Projects. The corresponding revised figures for the previous six months were £6.25m. and £2.5m. respectively. Only ten firms are represented in this part of the enquiry and it appears that the extent to which firms are employed for overseas contracts varies from time to time. The figures do not provide a guide to the amount of work which contractors are obtaining overseas.

TABLE I

Estimated Value of Work commenced by Private Quantity Surveyors

	FUTURE PROJECTS			NEW PROJECTS		
	Six months ending			Six months ending		
	31.3.60	30.9.60	31.3.61	31.3.60	30.9.60	31.3.61
	£ million			£ million		
Type of Building						
New Housing						
for public authorities...	34	23	26	53	49	46
for private developers	16	23	20	13	12	18
Other New Building						
Private industrial building	34	49	52	39	62	53
Private offices	34	61	38	21	22	29
Other commercial and miscellaneous building for private clients	36	39	49	28	38	40
Educational building (public and private)	73	54	44	63	57	67
Other building for public authorities ...	76	101	107	71	43	108
	303	350	336	288	283	361

TABLE II

Estimated Value of Work commenced by Private Quantity Surveyors in Scotland

	FUTURE PROJECTS			NEW PROJECTS		
	Six months ended			Six months ended		
	31.3.60	30.9.60	31.3.61	31.3.60	30.9.60	31.3.61
	£ million			£ million		
Type of Building						
New Housing						
for public authorities...	8	5	5	14	10	10
for private developers	—	—	0·5	—	0·5	0·5
Other New Building						
Private industrial building	1	3	1	2	2	1
Private offices	1	1·5	1	1	0·5	1·5
Other commercial and miscellaneous building for private clients	3	2	2	1·5	1	1
Educational building (public and private)	10·5	8	9	11	8·5	5
Other building for public authorities ...	9	6	18·5	12	4	3
	32·5	25·5	37·0	41·5	26·5	22·0

Building Research Station Digests

Digest No. 11 (Second series)—*Heating in Local Authority Flats*

The studies of house heating carried out some years ago at the Building Research Station provided a useful technical background for considering methods of heating for local authority flats. In flats, however, the pattern of running costs, capital costs and tenant preferences is different, and newer types of heating system have been widely used in them ; a survey of space and water heating in local-authority flats has therefore been undertaken, and the results have just been published as a Research Paper in the National Building Studies Series. The Digest presents and discusses some of these results, although in this interpretation it has been necessary to give the information in a simplified form. A range of space and water heating systems is considered ; the main type are central heating systems, electric floor-warming, and heating by individual appliances.

Digest No. 12 (Second series)—*Structural design in architecture*

This Digest, arranged to appear at the time of the Congress in London of the International Union of Architects, and stimulated by that event, departs from the usual pattern of the series. In looking at the processes of structural design, within the context of architectural design as a whole, the Digest does not attempt to collate information. Rather it sets out to explore a subject of wide scope on which different opinions may be held. The discussion, though as factual as possible, represents therefore a statement of one approach and not a solution to a problem.

It is not the practice to attribute Digests to any single author, but the present instance may be made an exception since a discussion of this kind must bear the marks of one man's approach. The Digest has been prepared by an engineer, Mr. R. J. Mainstone.

Digest No. 13 (Second series)—*Concrete mix proportioning and control*—1

Digest 44, issued in 1952, described the elementary principles for making good concrete economically. Whilst these general principles still apply, advances in concrete technology have led to a far more critical approach to the design of concrete mixes intended for structural use, where the requisite strength and durability have to be achieved with maximum economy of materials and labour.

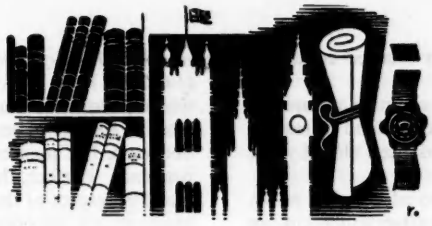
The cost of concrete of any given quality depends both on the materials used and on the care with which they are used. A rich mix gives high strength ; but the same strength can be achieved more economically by proportioning the mix properly and seeing that it does not change throughout the job. Mix design and quality control are discussed generally in this Digest. Materials for concrete were described in Digest 5.

Digest No. 14 (Second series)—*Concrete mix proportioning and control*—2

The quality of concrete, *i.e.*, its suitability for a particular purpose, depends largely on its strength and uniformity. Digest 13 explained the need for precision in the specification of concrete mixes and close control of the work on the site, to avoid wide variations in strength and wasteful use of cement while maintaining a suitable degree of workability. In this Digest the factors influencing strength and workability are considered in relation to mix design, and methods of site control are described.

Digest No. 15 (Second series). *Pipes and fittings for domestic water supply.*

This Digest deals with the plumbing installation for cold water supply for houses, but much of what is said here is valid also for larger buildings. Soil and waste plumbing is dealt with in Digests 48 and 49 (1st series) and an addendum to Digest 96. The installation is considered in its logical order, from the mains supply to the various types of outlet. In the second part, experience with the " Garston " ball valve is reviewed and remedies for some early defects are described.



PARLIAMENTARY AND LEGAL

The Rating and Valuation Act 1961

By HECTOR M. WILKS, BSC (F)

IT is our job, as chartered surveyors, to understand the requirements of this Act and to make valuations under the new provisions, but not to take part in the purely political aspect of rating. Nevertheless certain general comment is not out of place.

The reasons given for the introduction of any new statutes are frequently bewildering and often mutually contradictory. The Rating and Valuation Act 1961, when being introduced at its Second Reading on 30 November 1960 suffered certainly no less in this respect than other measures.

Firstly, it was described by the Minister as being a major step " towards everybody paying rates on full current values in place of the unsatisfactory chaos of different bases." Unfortunately the effect is immediately spoilt by providing for the derating of residential property by an unspecified percentage, by 50 per cent derating for charities, by providing a formula for water undertakings and the continued exemption of agricultural properties.

Secondly, we are impressed by the opinion that valuers must be told now, immediately, of the degree, if any, of derating applicable to industrial properties so that they may be able to make their valuations, having regard to the amount of outgoings by way of rates, in time for the 1963 List. This is, incidentally, tantamount to an invitation to " equate rent and rates." On the other hand, the valuers are directed to make their valuations now on residential property, in happy ignorance of the outgoings by way of rates, so that the degree of derating can be determined after the valuations are prepared.

Thirdly, a hint is given of the necessity for a revision of the scale of statutory deductions from gross to net annual value. On the other hand, no consideration seems to have been given to abolishing both gross value and the arbitrary scale of deductions at one fell swoop and of valuing all properties direct to net annual value—in fact more in line with most of the evidence available to-day.

Fourthly, the recently adopted method of granting relief to charities by perpetuating the proportionate relief enjoyed earlier is to be abandoned in favour of the " fair " method of 50 per cent derating. One is forced to ask : " Fair to whom? "

Fifthly, the replacement of the profits method of valuation for water undertakings by a formula-calculation. The Minister alleged : " There is general agreement that the old system of assessment for water undertakings should be abandoned." He did not say amongst whom the general agreement was alleged to exist. It would appear to be yet another case of accepted methods of valuation currently producing answers unacceptable either to the political or to the untutored mind, resulting in the adoption of arbitrary arithmetic. Incidentally, one wonders if anyone, parliamentarian or water undertaker, has considered the likely effect of the formula on the rate burden of water undertakings in 1963–64.

Sixthly, the introduction of yet another formula for certain specified classes of property—the NCB, the extractive industries, docks and harbours—with the avowed intention of not altering their rate liability. " It would be no part of the object to reduce or increase the total rate liability of those concerned " (Mr. H. Brooke, *Hansard*, 20 November 1960, column 406.) One has to think very hard to recall any other statutory provision specifically aimed at achieving nothing. One wonders also if the application of this new formula will perpetuate the nil assessment at Grimsby.

Seventhly, no attempt is to be made to rate agricultural hereditaments. Two reasons are given, (*a*) it would take so long and (*b*) the yield nationally would be very small. It is an odd form of logic that argues that if a job is likely to take a long time, put off starting it. It is hard on the agricultural rural districts, who collect no rates at all on upward of 90 per cent of their area, to be told that, however pressing their local problem may be, it is of no effect nationally.

Eighthly, a statutory abrogation of the decisions in *Bell Property Trust* v. *Hampstead* and *Peachey Property Corporation* v. *Green*, apparently mainly in order that the Valuation Office may be spared the trouble of making the valuations of flats which they ought to have made for the 1956 list—and did not.

A number of additional provisions are enacted, almost casually, yet of profound effect :—

1. The provision for apportionments of assessment at the whim of the rating authority without the necessity of lodging a proposal : see section 7.

2. The cessation of the deduction for drainage rates. Drainage rates have long been considered to be an additional burden and therefore properly to be deducted. In some areas drainage rates are getting onerous, a difficult time therefore to stop their deduction : see section 8.

3. A blanket exemption for public parks : see section 13.

4. The abolition of the necessity of the Rating Authority to keep a rate-book and the consequential loss of the right of the general public to inspect it and to take

extracts from it in respect of any matter contained therein : see section 14.

5. The institution of methods of claiming refunds of rates when no proposal has been lodged, and in respect of years for which the rate book has been closed : see section 17.

The commentary on the various sections of the Act which follows is not intended to be an exhaustive study nor an infallible guide. It is merely an attempt to explain the *main* purport of each section in as simple terms as possible. For minor points, details and precise meaning it is essential to refer to the text of the Act itself.

Section 1

As from the coming into force of the next valuation list (at present, this is to be 1 April 1963) there shall be no more de-rating of industrial and freight transport hereditaments. As from 1 April 1963, net annual value for these classes of property will equal rateable value.

Section 2

The Minister is given power to grant de-rating relief to residential property by way of a percentage deduction from net to rateable. The percentage may vary from administrative county to administrative county. It is a cause of real regret that the classes of property entitled to this relief are defined by the old wordings of section 2 of the Valuation for Rating Act 1953. Litigation on the interpretation of the difficult wording of section 2 will, therefore, be bound to continue.

Section 3

This section provides for the Minister's prescribing formulae for the assessment of properties occupied by the National Coal Board, the extractive industries, docks and harbours, and radio rediffusion undertakings. This is the section which is not to affect the rate liability of the occupiers concerned! Before any order under the section can be made, the Minister must consult with the local authorities and persons concerned. Unfortunately he is not required to have their agreement.

There is a curious provision here requiring an investigation into the working of the formulae in the year following the second valuation list made—presumably in 1969–70.

Section 4

This is another formula-making section ; this time applying to county and voluntary schools.

Section 5

The Minister may, by order, exclude from rateability certain classes of plant and machinery. The items that may be excluded are those normally falling within class 4 of the Order (The Plant and Machinery Order 1960, S.I. No. 122) and which satisfy two conditions. The two conditions are not susceptible of easy paraphrase and are therefore quoted :—

" (*a*) that it is the practice of the trade for which the item is provided to move the item or part from an hereditament, or situation in a hereditament, to another ; and

(*b*) that the weight, greatest dimension, and volume (each being measured as provided by the order) do not exceed such limits as may be prescribed by the order."

Section 6

This provides for the abrogation of part of the decisions in *Bell Property Trust Limited* v. *Hampstead Borough Assessment Committee* (1940) [2 K.B. 543] and *Peachey Property Corporation Ltd. Whaley, and Hampstead Borough Council* v. *Green* (*VO*), [53 R. & I.T. 656]. The section enacts that, in cases where payment is made by a tenant, by way of rent or otherwise, in respect of services, the cost of these services may be deducted, but no item for profit thereon, in arriving at the net rent. Further, that no deduction from gross rent shall be made in respect of the cost of repairs to, or maintenance and insurance of, the common parts of the block of flats, offices, etc., concerned. The effect is clearly to increase assessments of the affected properties. It is to come into force immediately. The repercussions of this section, in conjunction with the decision in *City of London Real Property Co.* v. *Stewart* [53 R. & I.T. 329], could be devastating and far reaching.

Section 7

For many years it has been possible to divide an assessment into two in certain restricted circumstances. Advantage could sometimes be taken of this where part of a property was void, provided the part was physically capable of being separately let. The procedure naturally involved the lodging of a proposal as the initiating step. Section 7 provides however, that if part of a property is unoccupied and will remain so for a short time only, the rating authority may ask for a temporary apportionment of the rateable value ; if the occupier agrees with the valuation officer's apportionment, then it becomes binding for the time being. It is difficult to see why any rating authority should use the section—for giving away rateable value. If the circumstances are temporary only, it is unlikely that a valid proposal could be maintained. However that may be, the parliamentary draughtsmen seem to have overlooked altogether the application of the section to industrial and freight-transport hereditaments.

Section 8

This section provides that deductions for drainage rates shall not be made in the next new list, nor shall any deduction be made for " Land covered with water."

Section 9

This section clarifies the extent of the hereditament to be valued in connection with advertising hoardings—see section 56 of the Land Government Act 1948 and *Imperial Tobacco Co. Ltd.* v. *Pierson* (*VO*) [6 R.R.C. 195]. As for the next valuation list, the value of the advertising right is to be enhanced by the value of the hoarding, frame, structure, etc., no matter by whom provided.

Section 10

Section 15 of the Burial Act 1855 laid down certain provisions as to the level of assessment of certain burial grounds. For the next valuation lists, these old provisions shall cease to have effect.

Section 11

This is a long and complicated section. In essence it provides that charities (with certain exceptions) shall pay rates on 50 per cent only of their normal net annual value, as from the date of the next list.

Section 12

This is a section ancillary to section 11 and, in effect, repeals certain old statutes giving special reliefs to certain types of charitable and similar organisations.

Section 13

After the long and wearisome series of cases concerning the

rateability of the various categories of public open space, section 13 comes as a welcome breath of fresh air. In general, it enacts that all open space used as a public park, under whatever powers, shall be exempt from rates as from the date of the next list.

Section 14

This allows the rating authority to make full use of punched card and other mechanised methods and systems of recording and calculating rate payment. The old requirement to keep a rate book is repealed. Gone with it, also, is the rights of the general public to inspect it and to take extracts. All that now remains is the right of a ratepayer to obtain a certificate in respect of his own property.

Section 15

This permits the Minister, by order, to vary the limits and rebates on the compounding of owners.

Section 16

This continues the right of a ratepayer to withhold part of the rate payable in the first year of a new valuation list. He is now required to lodge his proposal within 6 months (not 12 months as previously) of the new list coming into force, and the amount of rates he can withhold is one-half of the excess over the rates payable in the previous year.

Section 17

This permits of certain refunds of rates, not previously payable even if the rating authority were aware of an injustice involved. The rating authority may refund the amount (or part thereof) on the ground that :—

(*a*) the amount of any entry in the valuation list was excessive, or

(*b*) a rate was levied otherwise than in accordance with the valuation list, or

(*c*) any exemption or relief to which a person was entitled was not allowed, or

(*d*) the hereditament was unoccupied during any period, or

(*e*) the person who made a payment in respect of rates was not liable to make that payment.

But it is provided that no refund shall be made unless the claim was lodged before the expiration of six years from the date of the overpayment, or if the amount paid was charged in accordance with the practice generally prevailing at the time. When appropriate, the valuation officer is required to give a certificate as to the manner in which the hereditament should have been entered in the valuation list at the appropriate time had the necessary claim or proposal been lodged.

There are clearly many cases where power to make these refunds is appropriate and indeed proper. It seems a pity, however, that it is permissive only on the rating authority and not obligatory ; it is also a strange proviso that no refund shall be made if the general practice, however incorrect, had been followed.

Sections 18-23.

Part II of the Act, sections 18–23 inclusive, relates to the assessment of water undertakings. These undertakings are no longer to be valued but to have an assessment calculated on a formula. A cumulo value is to ascertain which will be adjusted from time to time for changes in the volume of water supplies, and changes in the net annual values of all other properties at revaluation. Certain transitional enactments follow. The cumulo then has to be apportioned amongst the rating authorities concerned in the same way as heretofore.

Sections 24–29

Part III of the Act, sections 24–29 inclusive, relates to minor and consequential enactments of which only one need be mentioned, namely, new provisions for contributions in aid of rates in respect of court buildings, police stations, etc.

Schedules

There are five schedules to the Act :

Schedule I lists the charities specifically excluded from the charitable relief in section 2.

Schedule II relates to calculations for the assessment of water undertakings and transitional provisions.

Schedule III relates also to water undertakings.

Schedule IV contains a mass of unrelated provisions, each quite important and many worthy of note :

paragraph 2 enlarges the definition of agricultural occupier to include the agricultural co-operative (refer to *Farmers Machinery Syndicate* (11*th Hampshire*) v. *Shaw* (*VO*) [53 R. & I.T. 233] and 1 R. & V. R. 69).

paragraph 3 allows a valuation officer, if requested by the rating authority, to delete assessments in respect of hereditaments that have ceased to exist, without the necessity of lodging a proposal.

paragraphs 4 *and* 5 are procedural, relating to proposals made while earlier proposals in respect of the same hereditament are still outstanding.

paragraph 7 provides for the Lord Chancellor to present rules for time limits of appeals from LVC to Lands Tribunal, in lieu of the present statutory and inflexible 21 days.

paragraph 11 is a strange, and apparently incomprehensible enactment, making provisions as to precepts issued on a rural district council by a borough and relates specifically to a " borough included in the rural district." Unless this paragraph has some future circumstances in view, it appears to be meaningless. See Local Government Act 1958, 7th Schedule.

paragraph 16 relates to the service of summonses and execution of warrants under the Distress for Rates Act 1960, and countermands the requirements of section 12 of the Metropolitan Police Act 1938 in this respect.

STATUTORY INSTRUMENT

The Building Societies (Authorised Investments) Amendment Order, 1961 (S.I. 1961, No. 1823, 3*d.* net) amends the Building Societies (Authorised Investments) Order, 1960 (S.I. 1960, No. 2091), which prescribed the manner in which building societies may invest their funds not immediately required for their purposes, primarily so as to permit such societies to invest their funds on loan or deposit with certain authorities having a character similiar to local authorities, and secondarily in some minor respects.

STATUTORY TENANCIES

The High Court in Northern Ireland has recently decided that, in certain circumstances, a statutory tenant is entitled to compensation on Compulsory Acquisition. A copy of the Judgment, together with a copy of the subsequent Award by the Official Arbitrator is available for reference in the Institution Library.

Public Health Act 1961— A Review

BY CHARLES CHANNELL (PA)

ON 3 August 1961 the Royal Assent was given to "An Act to amend the provisions of the Public Health Act, 1936, relating to building byelaws, to make such amendments of the law relating to public health and the functions of County Councils and other Local Authorities as are commonly made in local Acts, to amend the law relating to trade effluents and to amend section two hundred and forty-nine of the said Act of 1936."

By comparison with the 1936 Act of 347 sections, the 1961 Act is refreshingly brief. A mere 86 sections plus five quite straightforward schedules. As with its predecessor, the new Act does not extend to Scotland, Northern Ireland or to the administrative County of London apart from express provisions. The sections are arranged in seven parts and with the exception of Part III, which deals with the prevention and notification of disease, all fall within the professional orbit of the building surveyor.

The new Act is, of course, calculated to recognise contemporary trends and so bring up to date certain controls and regulations more particularly concerned with buildings, streets and sanitation. It is rarely possible to exercise competent and fair-minded statutory control with outmoded and ill-equipped legal yardsticks, hence the spate of legislation aimed at land and its occupation since 1945. The circumstances of building have undergone drastic changes during this period and one must hope that this latest addition will do much to rationalise the book of rules and to remove, as far as possible, those elements which give rise to doubts and frustration, both on the part of the applicant and of the local authority.

Between the Larceny Act, 1861, and the Land Compensation Act, 1961, there are 36 other statutes referred to in the new Act. It is interesting to note that no less than 20 of them have arrived within the last 16 years. They are, however, only mentioned in brief (apart from the 1936 Act) and can safely be set aside having noted the extent of repeal or amendment.

The seven parts of the Act are quite distinct and clearly defined in subject matter. Their provisions can therefore be examined separately but the following summary must, of necessity, be brief and confined to the salient features.

Part I—General

Sections 1–3

This deals with the construction, interpretation and extent of the Act. In the 1936 Act "Minister" refers to the Minister of Health but in interpreting the new Act "Minister" shall mean the Minister of Housing and Local Government.

Part II—Sanitation and Buildings

Building Regulations—Sections 4-11

Here, without doubt, is the most important part of the Act as far as amendments are concerned. Within the first paragraph of section 4, one finds that the Minister shall have power to make regulations in respect of those matters referred to in sections 61 and 62 of the 1936 Act (bye-laws as to buildings and sanitation and bye-laws relating to existing buildings) and local authorities shall no longer have power to make building bye-laws. Such regulations to be known as Building Regulations, to be enforced by local authorities within their district.

Formerly, local authorities made their own bye-laws being guided by model bye-laws drafted by the Ministry of Health and subsequently by the Ministry of Housing and Local Government. In general, the basic provisions of the models were absorbed so effecting a process of standardisation. This, in theory, should make for ease in interpretation and application but, in practice, a good deal of uncertainty has arisen. That which is acceptable to one authority might conceivably be rejected by another. In July 1937, the Minister of Health made reference in the Memorandum of the Model Bye-laws (Series IV) to the need for revision from time to time. Mention was also made of "the desirability of avoiding restrictions which would limit unnecessarily the use of new materials or new methods of building. . . ." The 1935 model also recognised that bye-laws should be adjusted to keep pace with current trends and everything possible should be done to reduce difficulty in interpretation. One finds by experience that difficulties are commonplace and often that unless the subject matter is completely on all fours with the yardstick, differences arise. Under the 1936 Act, one could apply to the local authority for a waiver subject to the consent of the Minister (section 63). This section has now been repealed, although the basic machinery is similar in operation. The application must now be made to the local authority (section 6 (5)) who in turn must transmit it to the Minister giving notice to the applicant of so doing. The new regulations, however, will in certain instances delegate power to local authorities to relax regulations and where applicable, reference to the Minister is not required.

In the event of the Minister or local authority giving a direction under section 6 to relax a building regulation, they shall publish in a local newspaper a notice describing the facts. Any representation to resist the direction on the grounds of its adverse effect on public health must then be made within 21 days. This procedure need not be followed in certain cases and not in cases where the proposed works effect only an internal part of a building.

For reference, building bye-laws will in future become "Building Regulations" and Part II of the Act comes into force ". . . on such date as the Minister may by order contained in a Statutory Instrument appoint. . . ." Other parts of the Act come into force ". . . at the expiration of the period of two months beginning with the passing of this Act." The regulations will in the main apply generally, although specific provision can be made to recognise local conditions in different areas.

During the passage of the Bill through Parliament, questions were asked as to how long it would be before the building regulations are made. In answer, the Parliamentary Secretary to the Ministry was not prepared to be specific, saying that it would not take ten years, nor would it take five years. It would, however, certainly be more than one year. From this, one can but interpolate and hope that it will be within three years.

The new regulations will be made by the Minister in consultation with a committee appointed by the Minister to be known as the Building Regulations Advisory Committee. He may also consult such other bodies ". . . as appear to him to be representative of the interests concerned. . . ." Members of the Committee will, incidentally, be paid expenses provided the Treasury agree. (Section 9.)

Local Authorities will continue to deal with plans deposited for approval under the regulations. Should any person contravene or fail to comply with the regulations he will be liable to a fine not exceeding £100 and, in addition, £10 for

each day thereafter on which the default continues. This will perhaps ensure a measure of observance beyond the present standard. Local authorities will now have at least five weeks and not more than two months (by agreement with the applicant) in which to give a decision on plans submitted for approval under the regulations.

Sewers, Drains and Sanitary Conveniences—Sections 12–23

The construction of sewers by a local authority invariably leads to increases in the value of land so drained. The Act therefore sets out to recover payments from owners should the local authority pass a resolution that, in their opinion, the construction of the sewer has increased the value of the premises. The resolution to be published in a local newspaper and come into operation on the date of publication. The amount of payment, whether the highway be a street maintainable at public expense or land subsequently laid out as a street, to be calculated as one-half of (*a*) the actual cost of the sewer, or (*b*) the estimated cost assuming a sewer of 9 inches in diameter at a depth of 7 feet, whichever is the less, having regard to the frontage. The Second Schedule describes in detail the methods to be employed in establishing cost and contributions together with an interpretation as to date of erection of buildings.

The cost of maintenance to public sewers is already dealt with under the 1936 Act. Minor amendments are now made relating to notice of proposed works. The testing of drains including the power to remedy stopped-up drains are also mentioned as are private drains and sewers. Penalties generally for non-observance have increased. Careful reference to the 1936 Act is necessary in order to appreciate the extent of the new provisions.

Section 23 is particularly sensible as local authorities may now, on application, supply on loan temporary sanitary conveniences when works of maintenance, improvement or repair are carried out by the authority, or under section 39 of the 1936 Act. Charges for this service can be made after the first seven days depending upon the reason for such works. In any event, charges so made must be " reasonable."

Buildings and Structures—Sections 24–33

Dangerous buildings likely to affect adjoining premises are recognised in the 1936 Act which empowers local authorities to deal with them. As for danger to persons in the street, action had to be taken under the Highways Act, 1959. Section 145 of that Act has now been repealed and the 1936 Act amended to embrace both contingencies. Local authorities will now find it easier to proceed against offending owners. There remain, however, the inherent problems of opinion as to what is and what is not dangerous, and it is interesting to note that the surveyor of a local authority may exercise powers conferred on that local authority by section 25 (1) " . . . without being empowered to act by the local authority. . . ." Clauses for recovery of expenses by the local authority are included, also provision for compensation in the event of unjustifible exercise of power.

Where premises are considered defective in that they are " prejudicial to health or a nuisance . . ." the authority can take remedial action under section 26. They can also proceed if, in their opinion, unreasonable delay would result from following the course dictated by sections 93 and 95 of the 1936 Act. This has the effect of dispensing with an abatement notice. Notice must, of course, be served but this will state that the authority intend to take action to remedy the defect in accordance with a specification.

Neglected sites and dilapidated buildings can now be tackled by local authorities. Formerly, it was only possible to serve notices in cases where conditions were a danger to public health. Since 1945, due in the main to demolition, numerous sites have been left vacant and these, more often than not, contain litter and rubbish arising from the demolition. Eyesores of this type will now be considered detrimental to the amenities of the neighbourhood. This is a commonsense approach to a problem which over the years has caused a good deal of irritation and inconvenience not only to adjoining owners but also to local authorities.

Section 28 will interest those persons who suddenly find that their chimneys fail to work properly because their neighbour has erected a taller building, or has raised on his existing building. Local authorities now have power to serve notice on the owner of the taller building requiring him to build up the adjoining chimneys and flues, in either the party wall or within six feet, to correspond in height with the new chimneys or top of the taller building whichever is the higher. Provided always that it is practicable to do so. Non-observance attracts a fine of £20 and the local authority can then take over and carry out the necessary work recovering their expenses in due course.

Safeguards are introduced in Section 29 relating to the demolition of buildings. Local authorities may serve a notice on the person undertaking the demolition requiring adequate shoring of adjacent buildings and weatherproofing of surfaces left exposed. Drains must be properly sealed off and all debris and rubbish must be removed. The section does not apply to internal works, or to buildings under 1,750 feet cube. There are also several other minor buildings which are not affected. Notice of intention to demolish must be served on the local authority. Appeals against shoring or weatherproofing directives may be made and, in general, the provisions of Part XII of the 1936 Act apply.

Unless premises form part of a railway station, an underground room or cellar must not be constructed without the consent of the local authority if the floor level is below the ordinary level of the subsoil water. Other premises are also exempt where under the Licensing Act, 1953 the Licensing Justices have made a provisional grant on deposited plans. Consents will be issued for the construction of such rooms provided certain conditions are observed. The conditions will be binding on successive owners.

Both existing and new houses must have adequate facilities for the storage of food. Deposited plans not showing suitable provision may be rejected. It is doubtful whether a refrigerator (or space for one) will be considered sufficient accommodation. Doubtless this will result in much argument as the old-fashioned larder is a space-devouring and cumbersome unit. One hopes that commonsense will prevail in assessing merit. Bathrooms with hot and cold water must also be provided both in new houses and in conversions. Failure to show this on plans will result in the plans being rejected.

Accommodation of Rubbish—Section 34

As with Section 27 (neglected sites following demolition) this section gives local authorities power to clean up sites. Here particular attention is given to conditions arising from the dumping of rubbish as distinct from building debris. The term " rubbish " does not apply to " . . . any material accumulated for, or in the course of, any business."

Filthy or Verminous Premises—Sections 35–37

Section 83 of the 1936 Act is amended regarding procedure to be adopted in dealing with this difficult problem. Detailed

cross-reference is necessary to fully understand the provisions of both Acts.

Part III

Prevention and Notification of Disease

Sections 38-42 are short and to the point. Their contents are self-explanatory. Everyone will be delighted to hear that dealers can no longer offer goldfish (or any other " living thing ") to children under fourteen years in exchange for rags or old clothes.

Part IV

Streets and Public Places

Streets—Sections 43–51

Consents and appropriate authorities in respect of works undertaken under this part of the Act are dealt within the Third and Fourth Schedules. Provisions are made to permit local authorities to erect barriers in streets where considered essential to secure public order or safety or to prevent congestion of traffic. Suitable occasions are not hard to envisage. In the event of a recurring problem, slots or sockets can be maintained in or under the surface of a street. The right of pedestrian access is preserved to premises, but in the event of an emergency, or on any occasion when a street is likely to be thronged or obstructed, car owners may not be able to drive into their premises or garage.

Section 45 deals at some length with the attachment of street lamps to buildings. The " Street Lighting Authority " may affix lamps, brackets, pipes, electric lines and apparatus (collective term is " attachments ") to any building for the purposes of street lighting with consent. Probably owners' views will be taken on design in certain cases particularly where there is a building preservation order.

Those premises having forecourts abutting a street will now be subject to the local authority's control in that any steps, projections or goods (whether for sale or not) must not inconvenience or obstruct the public. The authority are empowered to require the owner to fence his forecourt or otherwise obviate the danger. Stalls if considered " injurious to the amenities of the street " will have to alter in character or be removed. This sub-section (46 (2)) does not apply if the " erection " has been there at all times since 10 November 1960. This section deserves thoughtful administration.

Where private streets are in disrepair to the extent of being dangerous to the public, local authorities can now carry out such repairs as are in their opinion " urgently required." This is a short cut around the rather ponderous procedure under section 204 of the Highways Act, 1959. Danger to vehicles is also recognised.

Anyone now wishing to construct pavement lights or ventilators to premises beneath or abutting a street, must first obtain the local authority's consent. In other words, if you wish to make a hole in the pavement the authority must first consider the safety of the public for which they are responsible.

Local authorities can now drive vehicles on " footpaths, footways or bridleways . . . " without regard for statutory restrictions when cleansing or maintaining. This includes verges. Control will nevertheless be exercised by regulations made by the Ministers of Transport and Power. A suitable cartoon could best illustrate the potential of this section.

Section 50 refers to the Highways Act, 1959 and directs local authorities to require any person constructing a new street to provide separate soil and surface water drainage.

The anti-litter campaign has received recognition in section 51. Certain authorities may now provide and maintain " . . . receptacles for refuse or litter . . . " For many years farmers, in particular, have complained about the amount of litter thrown on the highways, and over hedges. Bottles and tins present dangers to livestock and also to farm machinery. Litter bins will probably help if placed strategically, assuming of course that they are cleared and cleaned out regularly.

Parks and Open Spaces—Sections 52-54

These sections deal with administration in general of parks, pleasure-grounds, boating pools and lakes.

Part V

Trade Effluents

Sections 55-71

The main reference here is to the Public Health (Drainage of Trade Premises) Act, 1937. Section 5 of that Act is repealed so withdrawing the right of local authorities to make trade effluent bye-laws. Other sections are also repealed and there is a good deal of amendment.

Apart from the general control of effluent one of the interesting items brought into focus is that certain sewerage authorities derive revenue from trade effluent. Chemical processing and current techniques doubtless cause a great deal of work in reception and disposal. A charge is therefore levied to cover the additional expense incurred by local authorities. This charge, however, will recognise any revenue derived in disposal. Bradford, it seems, is a classic example where in the combing and washing of wool, valuable by-products and natural grease are recovered. In 1951 sales of these commodities brought in £500,000. Sufficient is sold in some years to cover the entire cost of sewerage for the whole city and, in addition, to allow a contribution to the rates.

The sections should be read in full by those interested as the provisions are extensive.

Part VI

Miscellaneous

Sections 72–81

This part of the Act deals with the odds and ends. They cover the discharge of steam, derelict petrol tanks, pigeons, dodgems, pleasure boats, barbers and canal boats. Householders may now also have to pay up to £60 for a water supply instead of the £20 reserved in the 1936 Act.

Local authorities will be pleased to note that they may now take up arms against pigeons, house doves, starlings or sparrows without fear of reprisal under the Larceny Act, 1861. They must have regard, however, to the Protection of Birds Act, 1954.

Part VII

Supplemental

Sections 82–86

The Minister reserves power to amend local Acts passed before this Act or any order or other instrument made under any Act of Parliament before this Act should its provisions be inconsistent. Savings are provided relating to ancient monuments and planning law.

The Schedules

Here allowance is made to cover relaxations on existing work including transitional provisions and consequential amendments. Enactments repealed are set out in the Fifth and last Schedule.

Lands Tribunal Decisions

REVIEWED BY JOHN LELYVELD AAI (PA)

(1) Compulsory Acquisition—Statutory Basis—Restricted Value

The manifold duties of a chartered surveyor have included, until fairly recently, the preparation of a number of valuations for the purpose of submitting claims for the compulsory acquisition of land, which has involved the adoption of a hypothetical basis. This statutory requirement has, in some instances, proved irksome and attempts have been made to import into the valuation an element of additional value in order that the resultant claim might compare more closely with actual transactions. Such attempts have rarely met with success and this was exemplified by a recent case before the Lands Tribunal namely *Executor of Walter Bowler, deceased*, v. *Stockport Corporation* (Ref/138/1960).

This reference concerned the compensation to be paid for the compulsory acquisition of Offerton Hall Farm near Stockport in respect of which the relevant Notice to Treat had been served on 24 May 1947 under the County Borough of Stockport (Offerton) Compulsory Purchase Order, 1946. The property had been purchased in 1933 by Mr. Walter Bowler and comprises a large house known as Offerton Hall with a cottage structurally attached, an extensive collection of buildings mostly adapted for housing milking and store cattle and some pigs, together with land, the area of the whole being 111¾ acres. The land is mostly under grass and has the reputation of being good agricultural land but includes approximately 4 acres of woodland and rough-ground. Urban development has now been extended to the farm's western boundary.

Mr. Walter Bowler died in 1938 and under his Will his wife, his son, Mr. T. W. Bowler and his son-in-law were appointed executors. The property was left in trust to his wife for life and then absolutely to the three children, namely Mr. T. W. Bowler and his two sisters. Since the death of the testator, Mr. T. W. Bowler has occupied the farm and carried on the business of farmer and cattle dealer and during this period he paid to his mother the sum of £250 per annum.

Consequent upon accepting service of the Notice to Treat, a claim dated 21 June 1947 was submitted on behalf of the executors, in the sum of £34,000, being based upon a freehold value of £300 per acre. It appears, however, that nothing further transpired until 9 October 1959 and an added feature of interest in this case is that it is one of the few to come before the Lands Tribunal where the provisions of the Town and Country Planning Act, 1949, relating to long-standing notices to treat, have been invoked. Thus the Acquiring Authority served upon the claimant a " notice of intention to proceed " and the claimant, exercising his rights under section 15 (1) of the 1959 Act, elected to have compensation assessed as if the notice to treat had been served on 1 January 1958. As a result of this action, the statutory basis for the assessment of compensation became that laid down in Part V of the Town and Country Planning Act, 1947, and in particular section 51 of that Act and also in the Acquisition of Land (Assessment of Compensation) Act, 1919 (now re-enacted in the Land Compensation Act, 1961). In addition, regard was had to the provisions of section 35 of the Town and Country Planning Act, 1954.

In these circumstances the value of the interest had to be ascertained

> " on the assumption that planning permission would be granted under Part III of this Act [the 1947 Act] for development of any class specified in the Third Schedule to this Act, but would not be so granted for any other development. . . ."

The expert witness called by learned Counsel for the claimant submitted that, in his opinion, the amount of compensation under section 51 should be £33,500. In arriving at this figure he contended that the farm should not be valued on the basis of its rental value and in any case the annual payment of £250 should be disregarded. He considered that the rental value of the whole property in the open market would be £1,000 per annum to which he applied a multiplier of 30 years purchase. However, he went on to say that, notwithstanding the restriction which must be deemed to have been imposed upon the development of the land, practical experience had demonstrated that a purchaser might well be willing to pay something in addition to the " restricted value " in the expectation that the assumptions of section 51 (2) of the 1947 Act would be relaxed. He had therefore increased the figure of £270 per acre produced by his valuation to one of £300 per acre.

The Tribunal, in considering the representations, found that the payment of £250 per annum was an arrangement between the wife, Mrs. Bowler, and the Trustees and that in the absence of any review to produce conformity with contemporary farm rentals, was not a true indication of rental value on 1 January 1958. However, the main point at issue so far as the basis of assessment was concerned, was whether, had the property been placed upon the open market with vacant possession and in the circumstances which must be deemed to prevail, a purchaser would have taken into account the possibility that, at some future time, development would have been permitted.

No comparable sales had been put forward in evidence for the good reason that no known transaction had taken place in these hypothetical conditions. Such private sales as had been concluded at existing use value under the 1947 Act provisions had involved the payment of development charge which was not necessarily a measure of the development value especially in a rising market. The Tribunal found, therefore, that private sales of land on the basis of restricted value were no indication of the reaction of the market to the conditions which have to be assumed in cases of compulsory acquisition. In its ruling the Tribunal therefore relied upon the decision in Sampson's Executors and Nottingham County Council ([1949] 2 KB 439).

It may be recalled that this was a special case stated by the official arbitrator in which the Court was asked to determine the value of a piece of land at Ruddington, Notts. which it was proposed should be compulsorily acquired. The basis of the assessment was that laid down in section 55 of the Town and Country Planning Act, 1947, namely, that

> " in calculating the value of any such interest it shall be assumed that the land was, at the time of the notice to treat, subject to a permanent restriction prohibiting the carrying out thereon of any development other than development of the classes specified in the Third Schedule. . . ."

Learned Counsel put forward the fascinating argument that in cases falling to be settled during the intermediary period

for which the section provided, " permanent " did not mean " perpetual " but that there was always the possibility of obtaining a removal of the restrictions.

Lord Goddard C.J., in giving the judgment of the Court, said that under the Act development meant any change in the use of the land and permission had to be obtained before there could be any development of land. He thought they had to fix the value of the land on the assumption that development would not be permitted. There was a permanent restriction and therefore no development could take place. The case was therefore returned to the arbitrator with an intimation that the answer to the question as to whether certain considerations, other than its agricultural use, affected the value of the land was in the negative.

Thus the Lands Tribunal found that, in the case of *Executors of W. Bowler deceased* v. *Stockport Corporation*, the restriction laid down in section 51 (2) is a statutory one and must be applied in its literal sense.

(2) Compulsory Acquisition—Statutory Basis—Disregard of Proposed Acquisition

The decision in the case of *A. H. Sukmanski* v. *Edmonton Borough Council* (Ref/96/1960) provided guidance in connection with the factors affecting the assessment of compensation which, it is felt, will be of considerable assistance in similar cases. With the introduction of the Town and Country Planning Act, 1959, and its attendant reversion to " open market value " as the basis for compensation upon compulsory acquisition, an expression of relief swept through our profession which indicated no regret at leaving the realm of hypothesis. However, any illusion that the translation into practice of the provisions of the Act would be free from complications, was soon dispelled and this case provides an example of the difficulties which arise.

The reference to the Lands Tribunal concerned a claim for compensation in respect of the compulsory acquisition of a freehold house known as 152 Victoria Road, Edmonton, in the County of Middlesex and it was stated that a preliminary and vital issue is whether certain matters may in law be taken into account when valuing the property for this purpose. The facts were that on 27 May 1959, the Borough Council made a compulsory purchase order under Part V of the Housing Act, 1957, which was confirmed by the Minister on 2 December 1959. The notice to treat was dated 16 December 1959.

However, on 24 November, the Council had passed a resolution which had an important bearing upon the case. In the Council's minutes, which were headed " Unfit Premises " and in which reference was made to the representations of the Medical Officer of Health in regard to a number of houses including 152 Victoria Road, the following resolutions appeared :—

> " The representations of the Medical Officer of Health were referred to the Council with a view to the area being declared a clearance area. It is proposed to utilise the site for the erection of dwelling accommodation.
>
> Resolved (I) that arrangements be made to re-house the persons who will be displaced by the clearance of this area and any adjoining premises purchased in connection therewith, and
>
> Resolved (II) that a compulsory purchase order be made in respect of these premises—as shown on the map now submitted under Part III of the Housing Act, 1957."

In the event, the property with which we are concerned was omitted from the order made under Part III as, as stated by the Tribunal " it can only be assumed that by that time it had occurred to somebody that this particular house was in process of being acquired twice by the same local authority under different statutory provisions." Consequently it remained an acquisition under Part V and the parties were faced with the above circumstances in settling compensation. The claimant relied upon section 9 (6) of the Town and Country Planning Act, 1959, which, of course, reads as follows :—

> " No account shall be taken of any depreciation of the value of the relevant interest which is attributable to the fact that (whether by way of designation, allocation or other particulars contained in the current development plan, or by any other means) an indication had been given that the relevant land is or is likely to be acquired by any authority to whom the Act of 1919 applies."

Learned Counsel for the claimant therefore maintained that the whole of the proceedings of the Council on 24 November 1959 must be ignored and that the property must be valued in the open market free from any shadow that would otherwise be cast by the whole resolution.

On the other hand it was contended, on behalf of the Borough Council, that the first part of the resolution was not one to which section 9 (6) applied and that only the depreciation in value attributable to the prospect of acquisition must be excluded. It was suggested that the first part of the resolution related to the future clearance of the area which might only have invoked the demolition procedure under section 43 of the Housing Act, 1957, namely the making of a clearance order. In these circumstances no acquisition would have been involved and it was therefore correct in law to have regard to the effect such a resolution would have upon the mind of a purchaser.

This view, however, was not upheld by the Tribunal and in giving its decision stated that the Tribunal did not interpret the first part of the resolution passed by the Borough Council as a declaration of a clearance area, as a further and more formal resolution was passed on 22 December 1959. It was, however, a very clear indication of what the Council had in mind. The Tribunal went on to say that :—

> " . . . I think [the] suggestion that the Valuer at the date of notice to treat should take note of the first part of the resolution of 24 November, ignore the second, and then construe the first as failing to indicate what in fact the second part has made obvious, is a highly artificial exercise."

It is clearly the Tribunal's view that the intention to declare a clearance area as expressed in the minutes, was in itself an indication that the relevant land was likely to be acquired. The decision given therefore directed that compensation should be determined as if there was no evidence whatsoever that the house was likely to be compulsorily purchased by the local authority.

(3) Compulsory Acquisition—Equivalent Reinstatement

The cases which are referred to the Lands Tribunal where compensation falls to be assessed under rule 5 of section 2 of the Acquisition of Land (Assessment of Compensation) Act, 1919 (now re-enacted in section 5 of the Land Compensation Act, 1961) are comparatively few in number. It is therefore felt that it would be of interest to include a reference to the points arising in the case of *The Trustees of The Zetland Lodge (No. 1071) of Freemasons* v. *The Tamar Bridge Joint Committee* (Ref/137/1960). This concerned the acquisition of

The Chartered Surveyors Benevolent Fund

(INCORPORATED)

13, GREAT GEORGE STREET,
WESTMINSTER, S.W.1.

1st *January*, 1962.

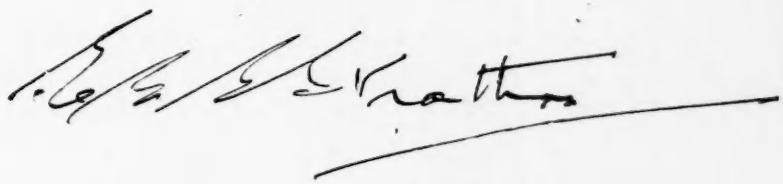
Dear Member,

BENEVOLENT FUND APPEAL

The Benevolent Fund needs all possible support in order to meet its obligations to members and their dependants who are unable to maintain themselves.

If you have not made your contribution I hope that you will do so now and that you will remember the Fund in future years.

Yours sincerely,



President of the Royal Institution of Chartered Surveyors.
Chairman of the Chartered Surveyors' Benevolent Fund.

NOTE :—Please see overleaf for the Schedule of Branch subscriptions for the year 1960-1961 with those of the previous year for the purpose of comparison.

Branch	Benevolent Fund Stewards or Hon. Secretary	No. of Members		Amount Subscribed per head of Branch Membership		No. of Subscribers to Benevolent Fund		Percentage of Members Subscribing		Amount Subscribed					
		1960-61	1959-60	1960-61	1959-60	1960-61	1959-60	1960-61	1959-60	1960-61			1959-60		
				s. d.	s. d.					£	s.	d.	£	s.	d.
Northumberland & Durham ...	A. B. Hindmarsh, I. N. Swanson	548	554	10 6	9 4	275	234	50·18	42·24	287	3	0	259	0	11
Eire	Hon. Sec. Eire Branch	159	159	9 5	8 2	69	62	43·40	39·00	74	17	4	65	1	6
Sussex	E. C. Cattermole	562	571	9 2	9 0	240	246	42·70	43·08	258	8	0	257	14	8
Ireland (Northern)	A. Kirk	283	297	7 11	7 8	113	111	39·93	37·37	112	0	5	114	9	6
Leicester, Northants & Rutland	W. C. Farnsworth...	342	332	8 10	6 8	136	120	39·76	36·14	151	10	5	109	19	7
Hants, Dorset & Wilts (South) ...	N. J. Freeston, P. G. Jessop, P. D. Turner-Powell	720	691	8 1	4 7	284	179	39·44	25·90	290	0	2	156	19	3
Kent	B. A. Champion, F. J. Linington, D. A. Stoakes, R. Tuttle	532	554	8 4	7 2	192	181	36·09	32·67	222	0	5	198	0	4
North Staffordshire	J. A. Knighton	159	166	4 6	3 2	56	38	35·22	22·89	35	4	10	26	9	8
Essex (Rural)...	W. H. S. Symons, M. Foster Taylor	480	472	8 8	9 8	168	186	35·00	39·40	207	4	9	229	4	1
Notts, Lincs & Derby	T. D. Hanson	658	699	5 5	4 6	224	193	34·04	27·61	178	1	4	157	3	8
Devon & Cornwall	A. F. King...	397	399	13 7	8 9	134	126	33·75	31·58	269	7	9	174	1	9
Cumberland & Westmorland ...	A. G. Holliday, J. T. Hart ...	101	103	5 4	8 5	34	63	33·66	61·16	27	3	8	43	10	4
Salop, Hereford & Mid-Wales ...	E. R. P. Jones	139	130	5 6	5 4	42	40	30·22	30·77	38	12	3	34	18	6
London (City & Eastern)	L. T. Donaldson	932	922	13 7	15 6	282	305	30·26	33·08	635	2	7	727	6	7
Glos, Somerset & N. Wilts ...	N. H. Darby, J. F. Bevan Jones, P. J. Kerr, R. S. Young	710	683	5 8	4 11	209	199	29·44	29·13	200	11	5	168	10	1
Surrey	A. Gadd, P. R. N. Ray, R. P. Cotterell, C. W. Bardwell ...	1108	1122	6 7	5 11	325	303	29·33	27·00	362	12	6	331	11	9
South Wales & Mon.	F. J. Matt, R. A. Samuel ...	638	642	6 0	5 8	186	161	29·15	25·07	193	12	7	181	14	2
Berks, Bucks & Oxon	D. J. Morton, F. A. J. Nash, G. W. Wrapson	582	548	6 10	6 2	167	165	28·69	30·11	200	7	2	170	0	0
Lancs, Cheshire & Isle of Man ...	C. Stuart Brown, T. Woolfenden, P. F. Sutcliffe	1473	1456	7 4	7 9	420	422	28·51	28·99	544	7	6	563	11	4
Beds & Herts	C. M. Nott, G. M. P. Williams ...	491	505	7 1	7 9	136	133	27·70	26·33	173	16	0	194	19	10
Warwick, Worcs & Staffs... ...	K. G. Chapman	942	916	6 1	7 9	259	255	27·49	27·83	287	1	9	353	11	1
Scotland	E. C. Dewick, J. C. Tait	2353	2321	5 3	4 10	644	606	27·37	26·11	621	16	1	561	18	2
Middlesex & Urban Essex	A. Kemp, Miss M. Pountney, A. Henderson Small	1060	1090	5 6	5 6	290	303	27·36	27·79	285	17	1	301	16	0
London (North-West)	G. L. Coates, P. G. Jonas ...	1983	1855	12 5	12 4	542	501	27·33	27·01	1230	15	1	1143	13	3
London (South-West)	W. H. Scanlan	1873	1717	8 3	8 4	505	453	26·96	26·38	771	14	9	714	8	7
Cambs, Hunts, Norfolk & Suffolk	H. J. Lowe	483	453	5 9	6 5	130	141	26·91	31·12	139	5	7	144	11	4
Yorkshire	C. Henderson, R. G. Lyle, J. R. Miller, E. Stephenson ...	1075	984	4 8	5 4	290	278	26·04	28·25	248	11	7	262	10	8
North Wales	D. R. B. Rieple	120	117	9 8	5 2	30	37	25·00	31·62	58	9	4	30	8	8

The Branches are in order of percentage of subscribers in the Branch ; the highest being at the top.

the Masonic Hall, Fore Street, Saltash, under powers conferred by the Tamar Bridge Act, 1957, notice to treat having been served in March 1959.

The building was originally erected as a Wesleyan Chapel in about 1808 and was so used until 1892 when it was sold and converted for the purpose of a Masonic Hall. The parties were agreed that compensation should be assessed upon the basis of equivalent reinstatement and it was further agreed that a building cost of 4*s.* 6*d.* per cubic foot should be adopted. A site had been purchased upon which it was proposed to build an entirely new Masonic Hall and it was submitted on behalf of the claimants that the amount to which they were entitled was the sum of 79,644.8 cubic feet at 4*s.* 6*d.* per cubic foot, namely £17,920 1*s.* 6*d.*, the cost of the site at £850 and a figure of £77 relating to road charges.

The cubic capacity is that of the old hall but it was argued for the Committee that a purpose built Masonic Hall could be more commodious although occupying less space than a Wesleyan Chapel. Evidence was called to show that the dining room was too big and some of the other rooms were unduly large and it was this premise that rendered the argument unacceptable to the Tribunal.

In giving its decision, the Tribunal stated that there was force in the argument that a modern builder would eliminate a lot of waste space when reinstating a building some 150 years old and that that saving should be reflected in the compensation. However, the trustees were entitled to decide what size rooms would satisfy their requirements within the limit provided by the capacity of the old building especially as, in the present case, there were good reasons for their decision.

Had the Tribunal been satisfied that a saving could be effected by the elimination of unnecessary height and waste space in passages it would have been persuaded to take this into consideration, but the computation put forward on behalf of the Tamar Bridge Joint Committee flowed from a basis which the Tribunal could not accept. Compensation was, therefore, awarded on the sum claimed by the trustees.

Legal Notes

By H. F. BIDDER (Associate)

I. NEGLIGENCE OF INDEPENDENT OPERATORS

The liability of independent contractors for their own negligence is well known and established. The liability of independent operators is less often heard of, and was analysed in some detail in the case of *Norton* v. *Canadian Pacific Steamship Ltd.* ([1961] 1 W.L.R. 1057).

The Liverpool Corporation were empowered by their Act of 1842 to license porters attending ships and carrying passengers' luggage, and to make bye-laws for them. The bye-laws had long become out of date, and had fallen into disuse : the porters remained under police supervision, and were organised under a system of control by themselves. A senior head porter allotted individual porters to an incoming ship, and received payment from the shipowner for distribution to the men employed. Motorised bogies had been provided jointly by the Canadian Pacific and Cunard Companies for use in the transport of luggage. They were easy to operate, and could be driven by any porter. One of these was being driven by M (not a party to this action) on the arrival of the *Empress of Canada*. He drove negligently, and injured the plaintiff N, also a licensed porter on the same job. N claimed damages from the defendant company on two grounds:—

(1) That the company were the masters of the porters, and were responsible for the negligence of M.

(2) That M was at the time the agent of the company, who were therefore responsible for his negligence.

The case came before the Court of Passage of Liverpool. The presiding judge rejected the first ground, holding that M was not a servant of the company. He found in favour of the plaintiff on the second ground, relying on the decision in the case of *Ormrod* v. *Crossville Motor Services Ltd.* ([1953] 1 W.L.R. 409 and 1120). In that case, a car was being driven for the owner by a friend, from Birkenhead to Monte Carlo. The friend also wanted to go to Monte Carlo. It was held that the owner was liable for the friend's negligence.

The company now appealed to the Court of Appeal, and their appeal was allowed.

Sellers, L.J. in his judgment said that M never lost his independence as licensed porter, and was in complete control of the services he was rendering, using the bogie for the better performance of the duties for which he was engaged and paid. The passengers or the shipowner were customers of him and his colleagues : they could direct where the baggage was to go, and could complain if it was mishandled ; but these were the ordinary incidents of porterage services. M as a licensed porter was exercising an independent calling. He was using the bogie for the purpose of his work and that of his fellow porters, and about the task for which they had been engaged. The fact that the company were joint owners of the bogie was insufficient to create liability on them for its negligent use. In *Ormrod's* case, the journey was for the joint purposes of both driver and owner. Here the company had no interest in the bogie's use in that sense.

" If consideration is given to control of the driving or the right to control the driving which has arisen in many cases, the company are clearly not responsible for that. . . . The independent porter, possibly under the general control of the head porter detailed to the ship, was manipulating the bogie and directing its use."

Pearson, L.J. said that the defendants did not exercise any control over the licensed porters as to the manner in which they were to use the bogies. The only question was the effect of the *Ormrod* case. It had earlier been held that, though the driver of a car may not be the owner's servant, the owner will be liable for his negligent driving if it be proved that at the material time he had authority, express or implied, to drive on the owner's behalf. Such liability depended, not on ownership, but on the delegation of a task or duty. (*Hewitt* v. *Bonvin* [1940] 1 K.B. 188.) " In my opinion the reasoning in *Ormrod's* case is based on the same principle. The owner of a car, when he takes or sends it on a journey for his own purposes, owes a duty of care to other road-users, and if any of them suffers damage from negligent driving of the car, whether by the owner himself, or by an agent to whom he has delegated the driving, the owner is liable. . . . There is no evidence here as to the existence or terms of any arrangement between the defendants and their passengers in respect of the conveyance of the luggage across the landing

stage to the customs shed. But if the defendants had in this respect assumed some obligation to the passengers, and had delegated the performance to the porters, they would still be responsible only for the due performance of the obligation, and not for any collateral negligence of the porters. . . . The porters use the bogies when and where and as they think fit; they use them on their own behalf and on their own business."

II. CERTIFICATE OF SEARCH OF REGISTER OF LOCAL LAND CHARGES

Finality of inaccurate certificate

It is provided by the Land Charges Act, 1925, that the local authority shall keep a register of local land charges, and that the authority shall, when required to do so, make a search of the register for subsisting land charges against particular land, and issue an official certificate of search, giving the result. Section 17 (3) is as follows :—

> " In favour of a purchaser or an intending purchaser [of land] as against persons interested under or in respect of matters or documents whereof entries are required or allowed as aforesaid, the certificate, according to the tenor thereof, shall be conclusive affirmatively or negatively as the case may be."

The effect of this subsection was anything but favourable to the purchaser in the case of *Stock* v. *Wanstead and Woodford Borough Council and Another* ([1961] 2 All E.R. 433). The " other " was the clerk to the authority, as official registrar. In order to understand the issue, it is necessary to go in some detail into the events that led up to it.

In 1957, a building contractor (the plaintiff S) was negotiating for the purchase of certain land, with a view to building houses upon it. This land was part of an area for which an application for planning permission for residential development had been made and refused in 1953.

By Part V of the Town and Country Planning Act, 1954, it is provided that compensation shall be payable in respect of refusals of planning permission before the commencement of the Act (January 1, 1955). Section 28 of the Act is applied, whereby it becomes the duty of the Minister to deposit notice of the compensation payable with the local planning authority, to be registered in the register of local land charges. This was done, and £2,645 was paid by the Minister as compensation.

Section 29 of the Act of 1954 provides that no new development shall be carried out on land as to which a compensation notice has been registered under section 28, until the amount of the compensation apportioned to the land to be developed, has been repaid.

During the negotiations for the purchase, the solicitors of S made a requisition on the local authority for a search in the register for any subsisting entries against the land for which he was negotiating, and for an official certificate. The certificate was supplied, for a small fee, and recorded that the search had revealed no subsisting entry relating to registrable planning charges against the land. In fact there was the entry above referred to.

Relying on the certificate, S purchased the land for £1,750, and submitted an outline application for permission to develop it. This permission was granted.

Shortly afterwards, S received a letter from the Ministry pointing out that compensation had been paid in respect of land that included the land he had purchased, and the proper notice registered, and claiming £1,612 as payable to the Minister before development could proceed, this being the sum apportioned to his land out of the total compensation paid. S paid the amount claimed.

S now brought an action against the local authority, and against their town clerk as registration officer, claiming to recover £1,612 as damages he had sustained through the issue of an inaccurate certificate of search. He based his claim either on an alleged contract between himself and the authority, or on a breach of statutory duty, or on negligence.

The defence was that S was under no liability to pay anything to the Minister, and therefore suffered no damage. The defendants based this contention on section 17 (3) of the Land Charges Act, 1925, set out above. They contended that the Minister was a " person interested in respect of matters whereof entries in the register are required," and that the certificate stating that there was no subsisting entry relating to planning charges was conclusive against him. For S it was urged that the Minister was not a " person interested " within section 17 (3).

Stevenson, J. in his judgment, after dealing with the facts and the relevant statutory provisions, said : " It seems to me plain that the notice of compensation registered in September 1956 places the Minister within the class described as ' persons interested under or in respect of matters on documents whereof entries are required or allowed ' to be registered, and that the certificate issued to the plaintiff became negatively in favour of the plaintiff as an intending purchaser of the land which he acquired. It has been agreed by counsel in this case that notice of the fact that compensation has been paid is one of the matters that are registrable as a local land charge, and is subject to the provisions to which I have just referred relating to searches in the local land register.

" I am forced to the conclusion that the effect of section 17 (3) of the Land Charges Act, 1925, was to absolve the plaintiff from any liability to meet the demand made by the Minister, and that the right to develop the land in question could not have been defeated by non-payment of this sum under section 29 of the Town and Country Planning Act, 1954.

" In these circumstances, it is not necessary for me to decide, and I express no opinion on, the question whether the issue to the plaintiff of an inaccurate certificate of search amounted to a breach of contract, or a breach of a statutory duty, or any other duty owed by the defendants to the plaintiff, and I dismiss the action."

The Editor welcomes articles, letters and other contributions for publication in *The Chartered Surveyor*.